the OIL AND GAS JOURNAL

FEB 25 1949

BJ SPEED-TRIP power slips saved the hole

0 Stands of Drill Pipe Saved
y SPEED-TRIP Power Slips

ED-TRIP BUILT-IN SAFETY FACTORS saved the hole on a
lifornia rig when the brakes went out. Pipe was
ing in the hole. 40 stands of drill pipe were running
when the driller hit the brakes and found he had no
ntrol. They were out like a boudoir light! Thinking
t, he tripped the Power-Slips. Acting under pressure,
slips immediately set on the drill pipe and stopped
string. Topside equipment... elevator, links, hook, and block... ended up on the floor, but no real damage was done to the rotary, Power Slips, or the hole.

THIS EXTRA SAFETY FACTOR is just one of the advantages of BJ *Speed-Trip* Power Slips. These Power Slips can be installed during drilling operations. They are the only Power Slips that can be swung 180 degrees away from the rotary thus giving maximum working room. BJ Power Slips have a double-acting pressure cylinder and a guide cylinder... You get pressure-raising and pressure-setting. Gravity lowering is slow and unbalanced. BJ Power Slips are the first pressure-lowered Slips. *Speed-Trip* Slips give you pressure-centering, uniform setting even when the pipe is not centered! FOR COMPLETE INFORMATION—write for the new BJ *Speed-Trip* Power Slips Bulletin.

Byron Jackson Co.
Since 1872
MAIN OFFICE AND PLANT
LOS ANGELES 54, CALIFORNIA
Mid-Continent Office and Plant, Houston 1, Texas
Export Office, New York 17, New York
Branches in All Principal Oil Fields

When all hell breaks loose, BJ *Speed-Trip* Power Slips save you real dough.

"*Speed-Trips*" are instantly raised or set by the driller's foot-actuated control valve

BJ MEANS ENGINEERED OIL TOOLS

XUM

U-30

ONE portable drilling unit for deepest well drilling

PORTABLE

SAFE

RUGGED

DEPENDABLE

ECONOMICAL

Moving day is a comparatively light chore when you use the U-30. That's why, in one year's time, UNIT RIG'S Big U-30 is making such a hit with drillers. The U-30, like all UNIT RIG equipment, is a compact unit, enclosed in a heavy steel plate case, and can be transported to location ON ONE TRUCK.

Investigate the U-30 for all deepest well drilling jobs. The performance of the U-30 in actual drilling operations has actually amazed even the most critical and particular drillers hardened by years of operating many types of equipment.

Get the Facts . . . Write for U-30 Bulletin

UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB . . . .

Exclusive Export Representative
MID-CONTINENT SUPPLY CO.
42 Broadway, New York City
Cable Address: MIDUNITRIG

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Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed	¼"–2"	150	225
	2½"–4"	125	175
Flanged	1"–2"	125	200
	2½"–4"	125	175

Fig. 709 Saddle Style — Inside Screw — Bronze Mounted or All Iron

Walworth

iron body wedge gate valves

...the last word in Dependability

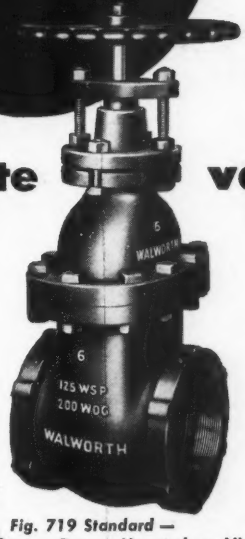

Fig. 719 Standard — Non-Rising Stem — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14" and larger	125	150

Fig. 726F Standard — Outside Screw and Yoke — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14"–16"	125	150
	16" and larger	*	150

* For steam service requiring valves 18" and larger we recommend the use of Walworth 150-Pound Cast Steel Valves.

Walworth Fig. 709 Saddle Gate Valves are recommended for lines carrying sludge, and fluids of high viscosity. They are easy to take apart, clean, and put together. They are available in either bronze mounted or all iron types, screwed or flanged ends. Two holes inside the bonnet of bronze mounted valves permit draining when the valves are open, thus eliminating the risk of damage to the valve due to freezing. All parts are designed for maximum service and strength.

Walworth Fig. 719 Standard Non-Rising Stem Valves are recommended for general service. The bronze mounted valves are furnished with bronze stems, seat rings, and disc faces. The all iron valves have nickel-plated steel stems, integral disc faces, and renewable screwed-in seat rings. Non-rising stems make them suitable for use where clearance is a factor. When the valves are open, the disc is clear of the fluid passageway.

Walworth Fig. 726F Standard OS&Y Valves are especially recommended for steam and services above atmospheric temperature. Their streamlined ports permit smooth, easy flow.

For further information about Walworth Iron Body Valves, as well as Walworth's *complete line* of valves, fittings, and flanges, see your nearby Walworth distributor, or write:

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valves and fittings

60 East 42nd Street, New York 17, N. Y.

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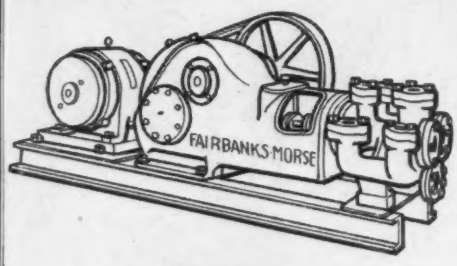
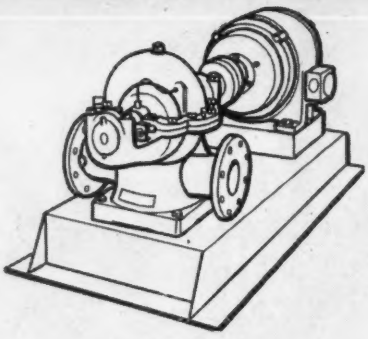
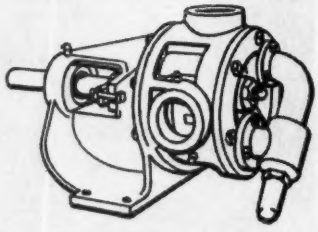


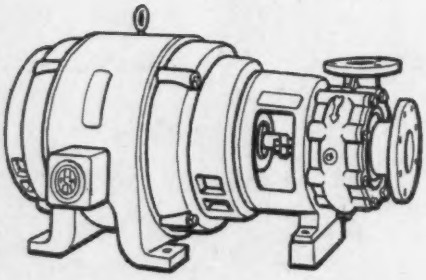
Power Pumps



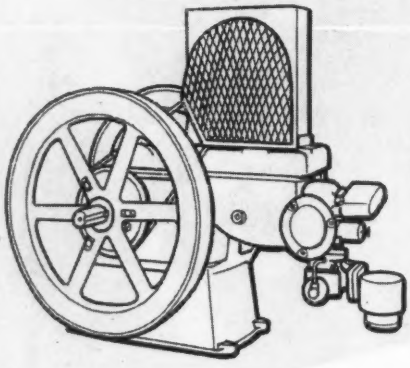
Centrifugal Pumps



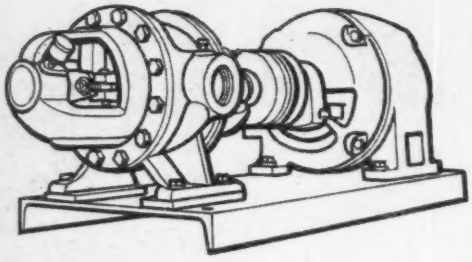
Rotary Pumps



Builtogether Pumps

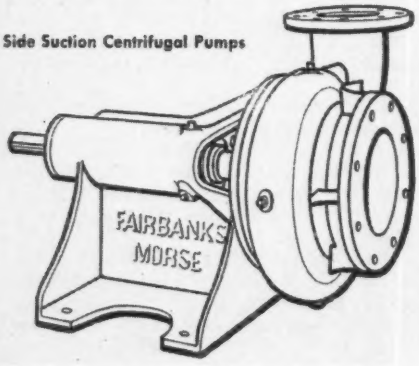


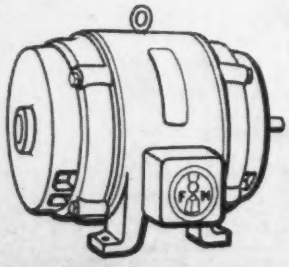
ZC Engines



Westco Pumps

Side Suction Centrifugal Pumps





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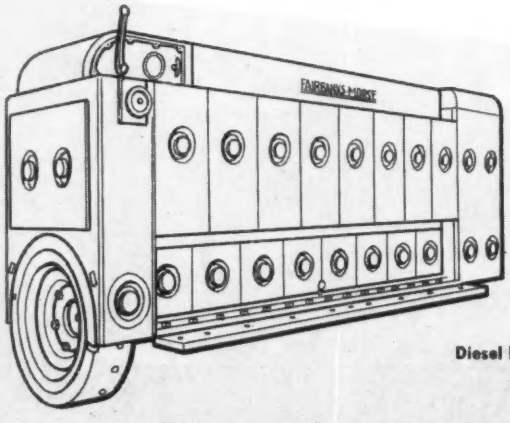

Diesel Engines

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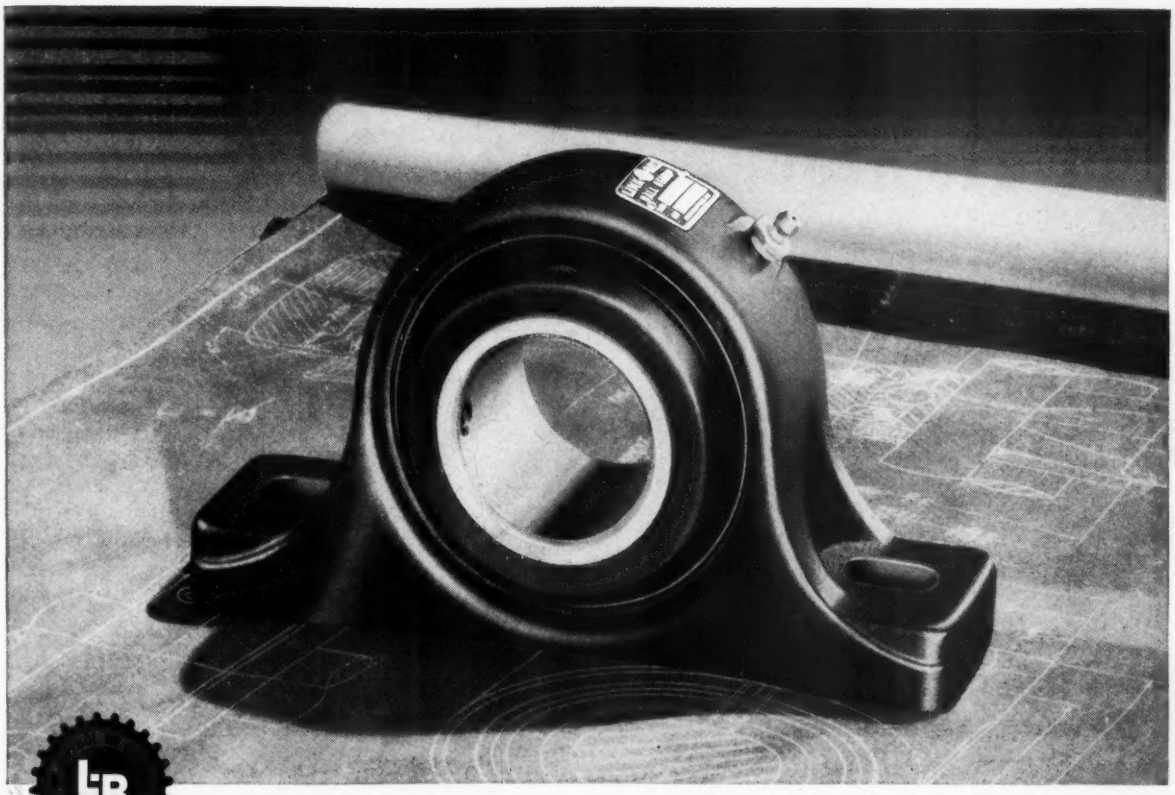

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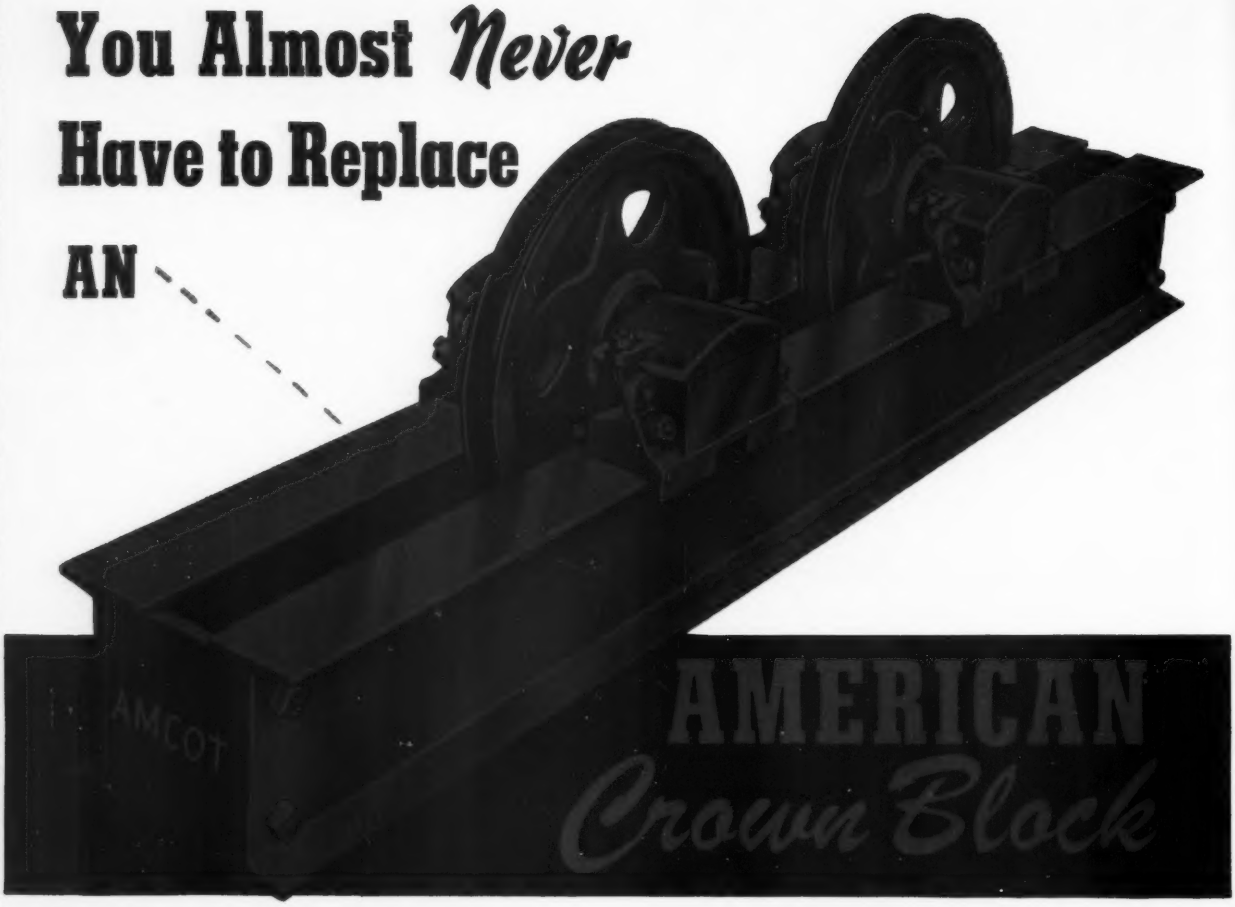

SHEAVES—grooved to API specifications . . . machined and inspected . . . semi-steel, pressed on a steel shaft . . . furnished in any combination of sizes.

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BEAMS—standard I beam sections, joined with solid cast spreaders and tie bolts.

Once you put an American Crown Block in service you can forget it, except for occasional lubrication, which is quick and easy. In most fields, weather is as hard on crown blocks as the wear they receive, so American Crown Blocks are designed with full protection against bearing contamination and flushing by rain, and blowing sand and dirt. That's why today's American Crown Blocks are the safest, longest-lasting, most economical crown blocks we have ever built. Ready for shipment NOW in any quantity you need. Place your order today with your favorite supply store or the nearest American office.

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SINCE 1924

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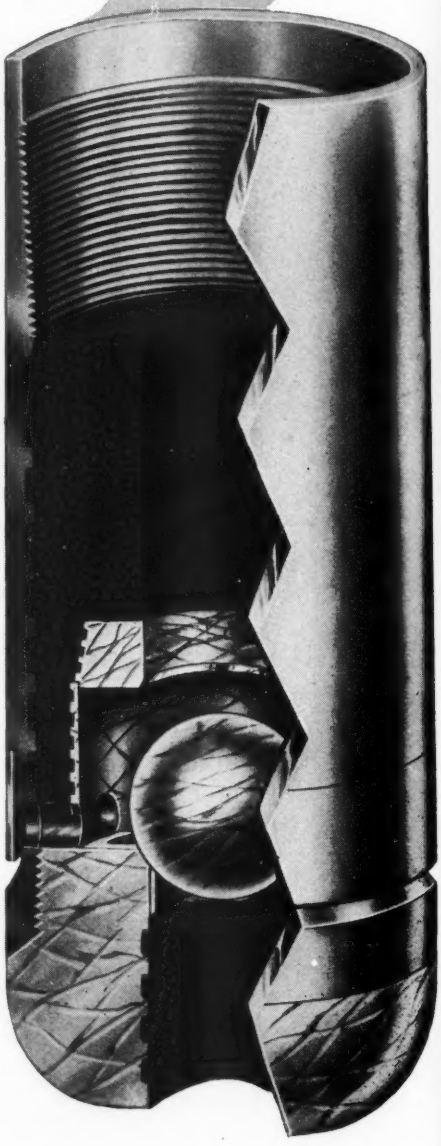
If you have not used NBT Oil Loans, you are invited to submit your development needs to "The Oil Bank of America," where sound planning and financing are based on practical experience, friendly understanding and mutual interest.

The Oil Bank of America

NATIONAL BANK OF TULSA

Member Federal Deposit Insurance Corporation

POSITIVE SIDE-ACTION SLURRY
with the first stroke of the pump



Larkin Geyser Shoes are constructed so that fluid is discharged *with the first stroke of the pumps* from a "perfect circle" area-way which completely encircles the shoe, rather than from individual lateral or oblique ports. Part of the cement slurry is also discharged downward from the bottom port.

This Larkin side-action slurry . . . widely accepted as standard equipment for cementing success . . . contributes everything possible for successfully landing and cementing casing: *it washes out cavings, bridges and other obstructions — it washes mud cake from the well bore — it distributes slurry evenly at the shoe point — it minimizes channeling.*

So measure the value of your cementing equipment by what it will do. Buy Larkin floating and guiding equipment through your supply store.

LARKIN

...Through Your Supply Store

LARKIN PACKER COMPANY, INC.
ST. LOUIS, MO.

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A Great Seller

...because it's a Comfortable Eye-Protector!

AO F-9200 Acetate Goggle

When we brought it out, we were sure there was a great future ahead for this goggle of non-flammable cellulose acetate butyrate—but its popularity has surprised even ourselves! Here are its features that workers appreciate:

1. ASSURED PROTECTION.
2. Hinges and temples out of line of sight.
3. Smarter appearance.
4. Lenses that conform to and cover eye orbit.
5. Improved fit.
6. Comfortable, lightweight, face-formed bridge.
7. Nosepads which distribute goggle weight *evenly.*

This goggle does a prime protection job on operations in chemical and electrical plants where the tiniest spark might cause fire or explosion. Because of its acetate construction it is especially recommended for these and similar jobs where metal goggles might not be recommended. Available with ventilated side shields for added safety against lateral-striking objects. Lenses are 6-Curve Super Armorplate. When protection from glare, ultraviolet or infra-red radiations is a "must", specify Calobar lenses. For a handy source of supply, see the AO Safety Representative.

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Raymond cast-in-place concrete piles cannot be excelled for permanence and carrying capacity. Many types are available to meet any subsoil condition. With Raymond on the job, full compliance with job requirements is assured.

Pictured above is Raymond's 1300-pile foundation for the new Caterpillar Tractor Company Building LL at Peoria, Ill.

THE SCOPE OF RAYMOND'S ACTIVITIES includes every recognized type of foundation construction—concrete, composite, precast, steel, pipe and wood piles. Also caissons, underpinning, construction involving shore protection, shipbuilding facilities, harbor and river improvements and borings for soil investigation.

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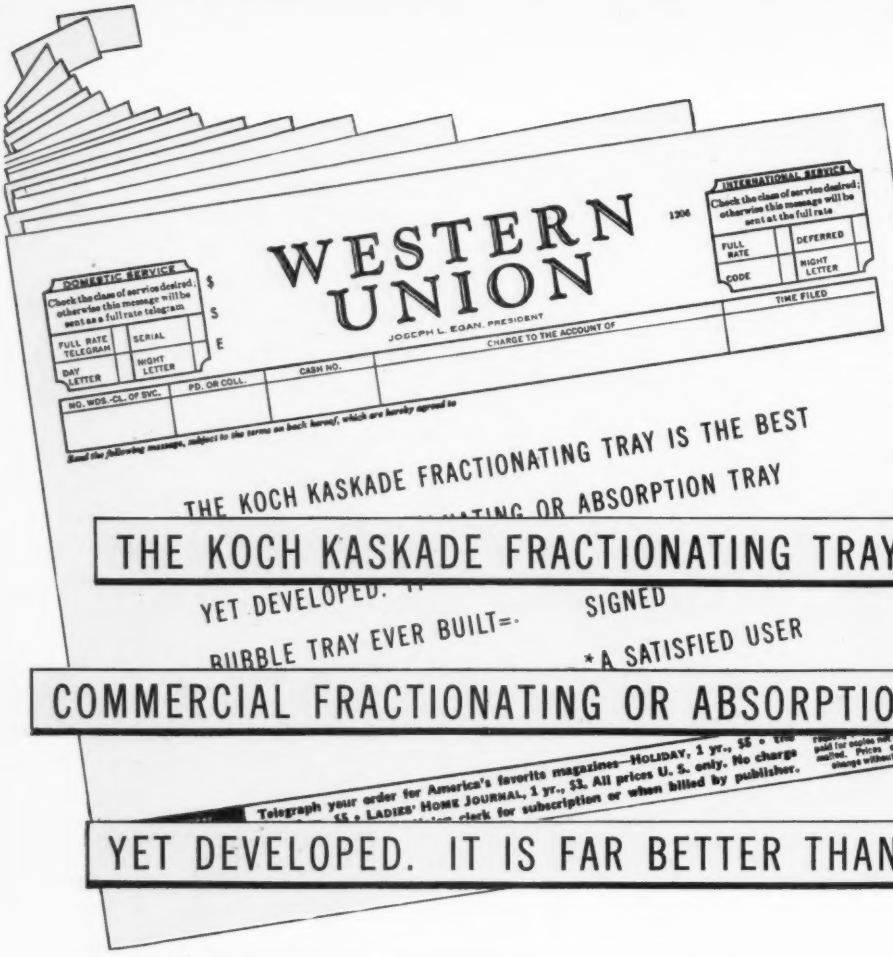
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BUBBLE TRAY EVER BUILT= SIGNED

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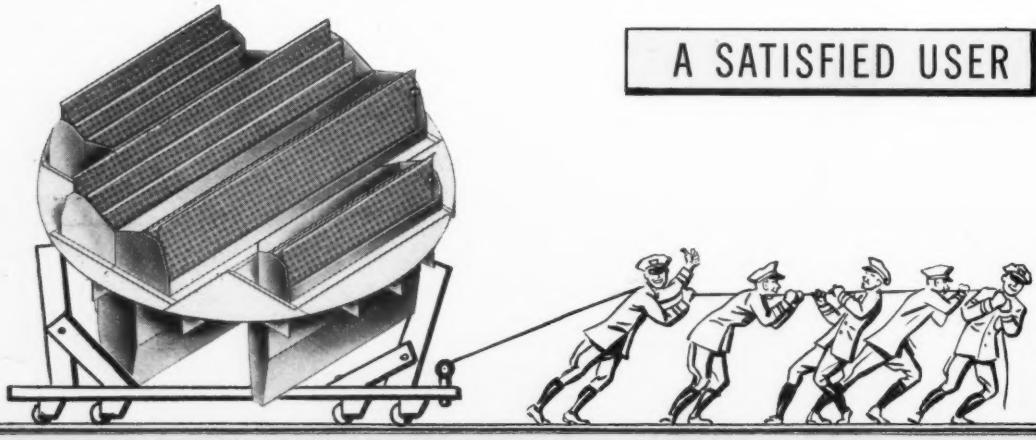

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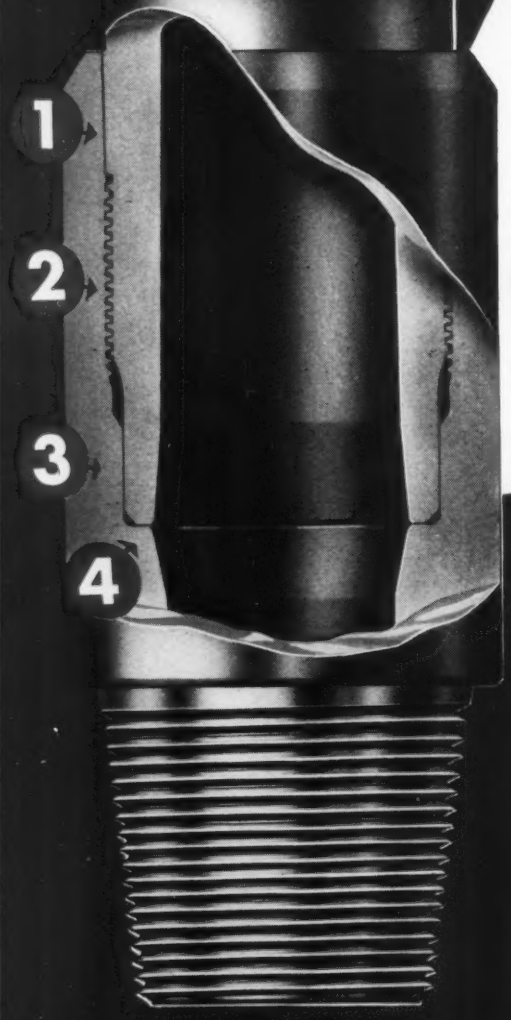

The **HIGHER** *and* *The* **TIGHTER**

Check this
4 POINT PROTECTION

1. STABILIZER SEAL
2. THREAD SEAL
3. INSIDE SEAL
4. SHOULDER SEAL

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SIMPLICITY OF DESIGN is the key to the perfection found in our Straight Grip Tool Joints! Our simplified design so controls the reduction of area that the SEAL BECOMES TIGHTER as high tension loads and pump pressure increase. And this design also provides an inside seal . . . actually giving you four sealing areas! And remember, American Iron's simplified method of field installation and removal of these tool joints is as advanced as Straight Grip Joints themselves. They're designed right . . . made right . . . and installed right — for positive protection against joint leakage and creep!

THE TENSION LOAD

pump pressure . . .

THE SEAL!

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Also manufacturers of A. P. I. and "Amweld" (counterbore weld) Tool Joints

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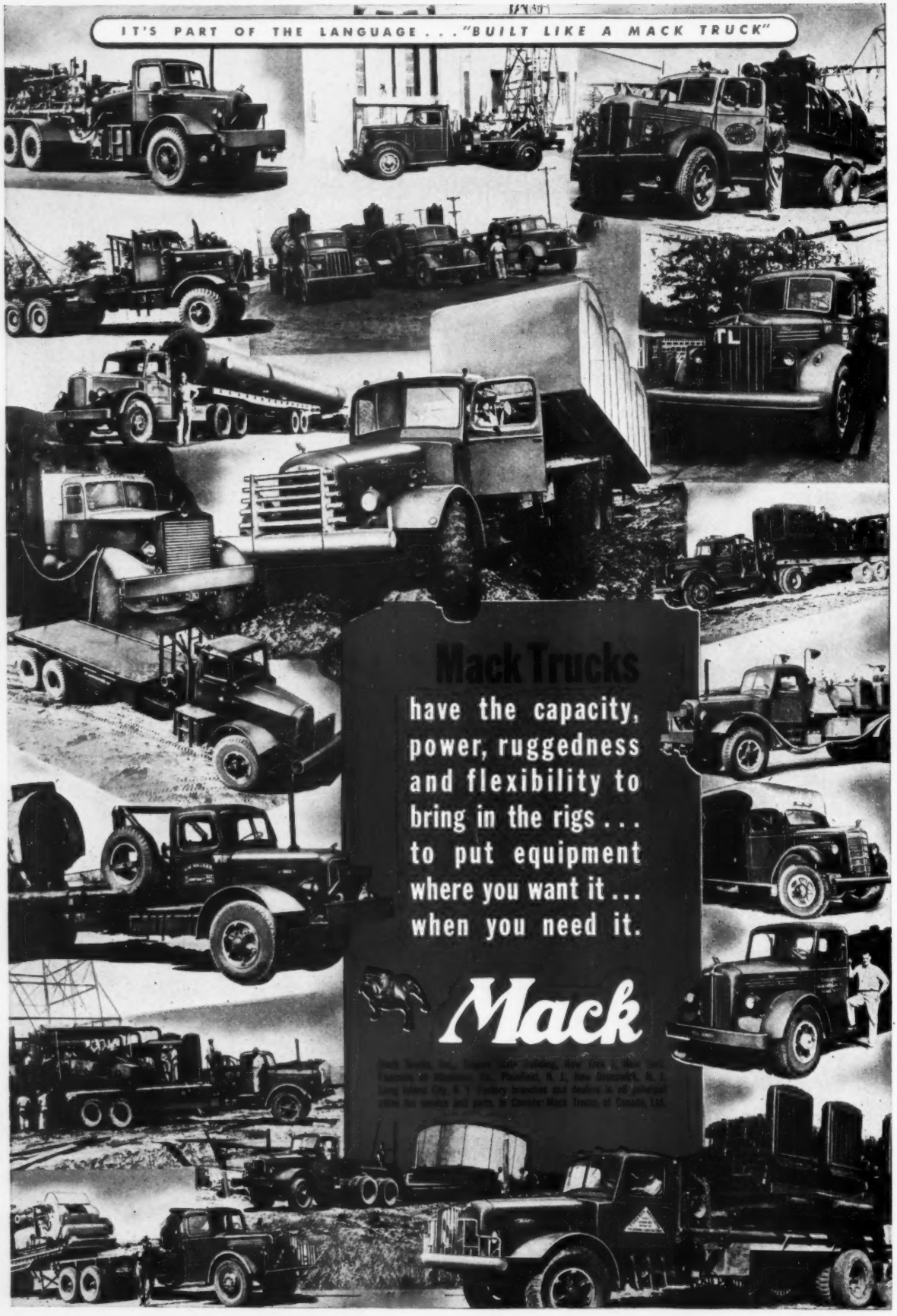

IT'S PART OF THE LANGUAGE . . . "BUILT LIKE A MACK TRUCK"
Mack Trucks
have the capacity, power, ruggedness and flexibility to bring in the rigs . . . to put equipment where you want it . . . when you need it.
Mack

Tornado!

Driving, ripping, slashing power. One of Nature's most dreaded phenomena. Yet Bethlehem has harnessed much of this same power, calmed it, and put it to work in a great new drilling rig—the Bethlehem Tornado. Here is a mighty 3-engine rig for deep-hole drilling—13,500 feet; an outfit air-controlled from start to finish.

Despite its tremendous power and reserve, the Tornado is an easy rig to handle. With control at his fingertips, the driller is always in command. His job is made still easier by automatic self-adjusting clutches.

Full details are available now — today. Ask for the story of this new-era drilling rig.

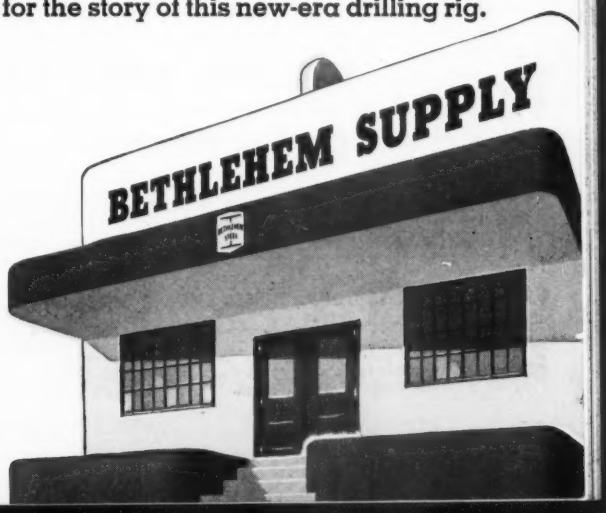
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second Street, Tulsa, Okla.

Subsidiary of Bethlehem Steel Corporation

On the Pacific Coast Bethlehem Oil-Field Equipment is sold by Bethlehem Supply Company of California

BETHLEHEM STEEL



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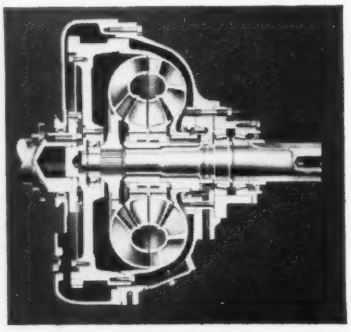
A Combination Torque Converter and Fluid Coupling *Integral with the Engine*

General Motors 71 Diesels equipped with the new GM Torque Converter take up no more space or weight than the same engines with conventional friction clutch and power take-off. Available in 3-, 4-, and 6-cylinder single engine units, Twin 4 and Twin 6 models having engine ratings from 75 to 300 H.P.

The NEW General Motors DIESEL ENGINE-TORQUE CONVERTER UNIT

HERE is a complete, integrated Diesel engine-torque converter unit that combines the inherent efficiency of the GM 2-cycle Diesel engine with the features and advantages of *both* torque converter and fluid coupling. It provides *torque multiplication up to 4 to 1* for starting variable heavy loads. It also provides *highly efficient transmission of power* during light load periods by *automatically shifting to fluid coupling* in the upper speed range.



In the new GM Torque Converter, oil does the work. Automatic transition from torque multiplication of 4:1 at stall to 1:1 in upper speed range.

A smooth, uninterrupted flow of power, delivered through a liquid, *prevents engine stalling* under any load and *protects both engine and driven machinery from sudden shocks.*

One Manufacturer—One Responsibility

Up to now most engines and hydraulic drives have been separate units. The result—compromise designs and divided responsibility. Now General Motors offers a new torque converter specifically designed and manufactured as an integral part of the General Motors Series 71 Diesel engine. It is a self-contained unit built by one manufacturer providing a long needed saving in space and weight as well as certain desirable operating characteristics not available before.

This new power unit will get the most work done in the least time because the engine operates in its most efficient speed range at all times—delivering maximum engine horsepower regardless of the speed of the load. *Maximum torque to start heavy loads PLUS maximum horsepower to keep the load moving.*

Everyone with a hard job to do in the oil fields, in construction, in mining or in logging should have all the facts about this compact, flexible GM Diesel Engine Torque Converter unit. *Write today for a complete description.*

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS . . Up to 800 H.P.

GENERAL MOTORS

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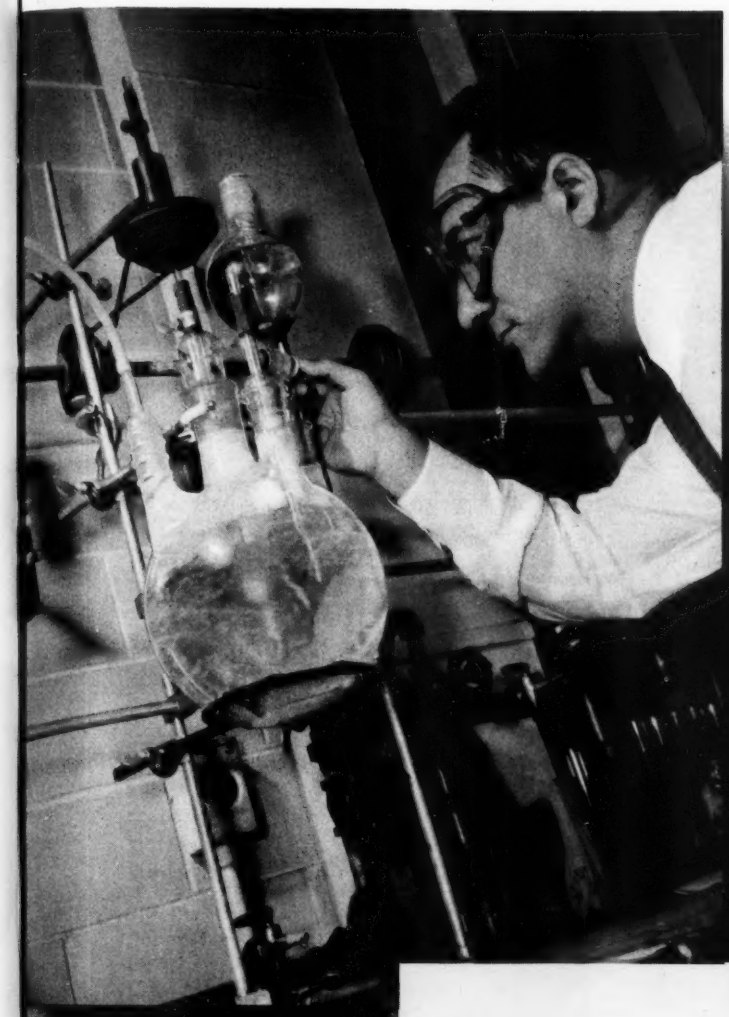
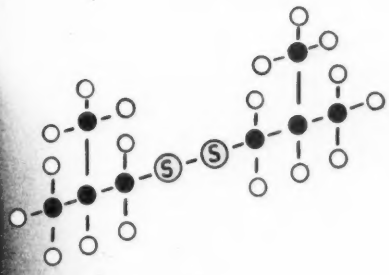
DUPONT TETRAETHYL LEAD COMPOUNDS



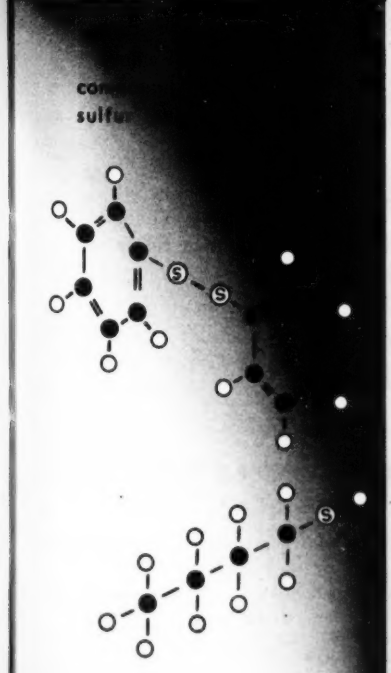


Du Pont Research

at Work on the

Problem of Sulfur

in Leaded Fuels



To understand better the mechanism of the anti-knock action of tetraethyl lead, and to improve the efficiency of its use, Du Pont has undertaken a broad program of research. Among the problems being studied is an investigation into the effect of sulfur compounds upon the octane number of leaded fuels.

It has long been known that sulfur, even at the relatively low concentrations that occur in present day motor fuels, causes a significant reduction in the octane number of gasolines containing tetraethyl lead. However, the chemistry of the effects of sulfur compounds in leaded fuels has not been well understood. The many phases of this problem are being thoroughly investigated, applying chemical experience acquired over many years.

This is another example of Du Pont working to help the petroleum industry produce better petroleum products at the lowest possible cost.

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living . . . Through Chemistry

XUM

Research...

to Help Every Refiner

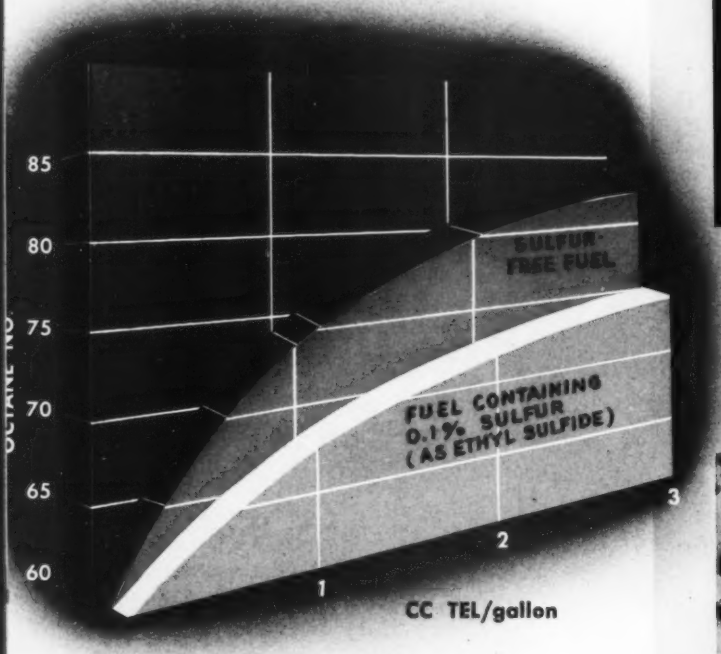


CHART SHOWING EFFECT OF SULFUR ON TETRAETHYL LEAD EFFICIENCY IN A 60 OCTANE REFERENCE FUEL

Among the problems of vital concern to the refiner is the improvement of tetraethyl lead efficiency in gasolines containing sulfur compounds. While the effect of sulfur on octane number in non-leaded fuels is insignificant, in leaded fuels it is pronounced and the chart graphically illustrates this.

Tetraethyl lead efficiency in sulfur-containing fuels can be improved by reducing the sulfur concentration. The efficiency of TEL is also dependent upon the type of sulfur compounds present, some having a more adverse effect on octane number than others. Du Pont research is working toward a better understanding of the anti-knock action of tetraethyl lead in the presence of sulfur, as well as improving the efficiency of TEL's use.

The first of a series of technical papers on the subject of sulfur in leaded fuels, prepared by Du Pont research men, entitled "The Effect of Sulfur Compounds on Octane Number of Leaded Fuels—Part 1" is now available. Write the nearest District Office for your copy.

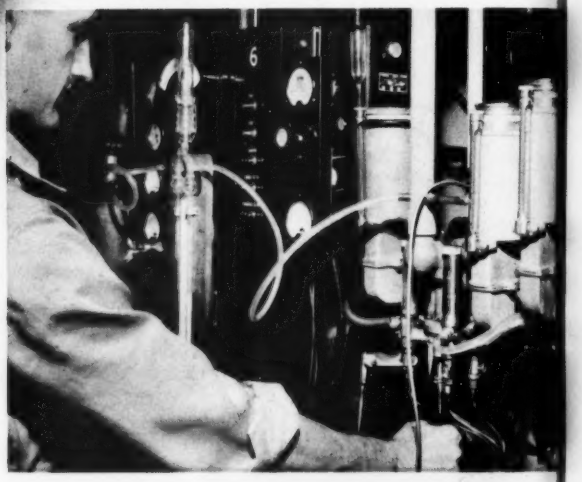
DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

▲ Apparatus used for laboratory experiments on sulfur.

▼ CFR engine equipped for special tests to study effect of sulfur on octane number.



MAKE DU PONT THE SOURCE FOR ALL OF YOUR GASOLINE ADDITIVES . . .

- ***Tetraethyl Lead Compounds Aviation Mix—Motor Mix***
- ***Antioxidants***
- ***Metal Deactivator***
- ***Dyes***

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PETROLEUM CHEMICALS DIVISION

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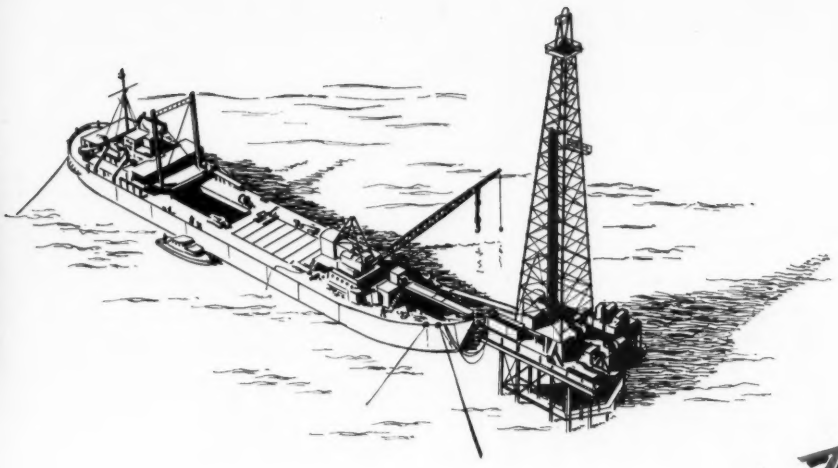
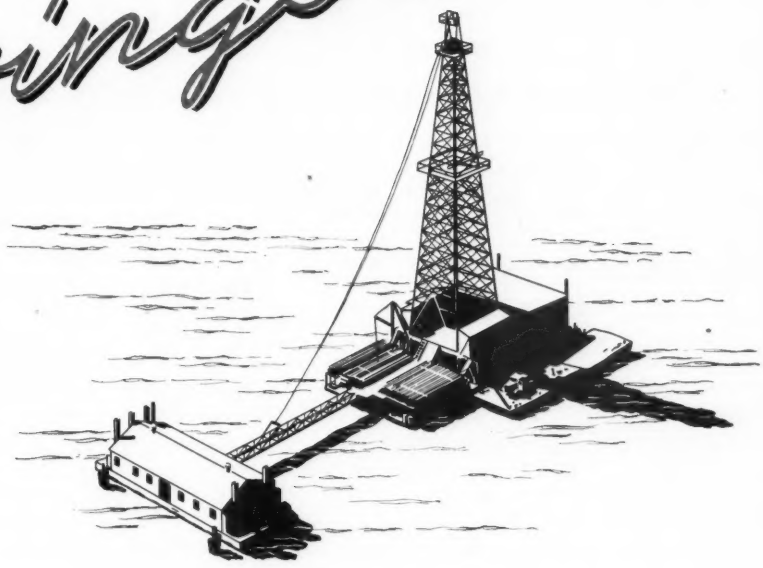


Levingston



PIONEER IN THE DEVELOPMENT OF MARINE DRILLING EQUIPMENT –

Specializing in Submersible Drill Barges and Offshore Drilling Tenders

Levingston

SHIPBUILDING COMPANY

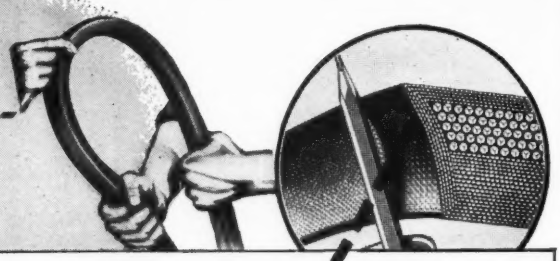
ORANGE, TEXAS

Grip the Sides of

ANY V-Belt...

FEEL the Sides CHANGE SHAPE

as the belt Bends—



-That SHOWS you Exactly WHY

THE CONCAVE SIDE

(U. S. PATENT NO. 1813698)

SAVES You MONEY

Bend any V-Belt and you can actually feel its sides change shape.

That's because the bending puts the top of the belt under *tension*, while the body undergoes *compression*. Naturally the sides of the belt *bulge out*—and if the belt is built with *straight sides*, you get the result shown in Figures 1 and 1-A, below:—

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove.

Clearly, the bending forces a straight-sided V-Belt into a shape that does not fit the sheave-groove—and the bulging produces excessive wear along the *middle* of the *sides*.

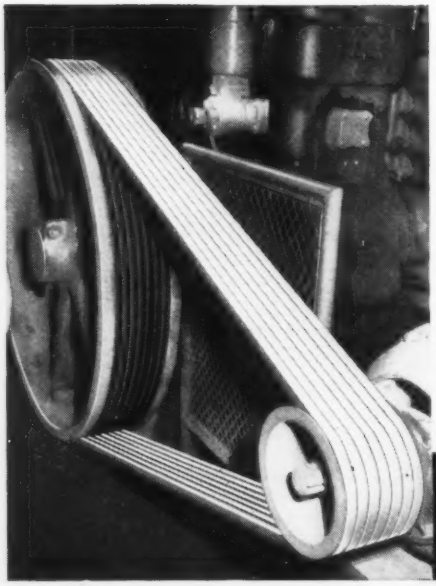
Now, bend the V-Belt built with the precisely engineered Concave Side (U. S. Patent No. 1813698)—the Gates Vulco Rope.

Gates Vulco Rope With Concave Side.

No Side Bulge. Precise Fit in Sheave-Groove.

You get the same shape change but *now* the new shape *exactly fits* the sheave-groove as shown in Figures 2 and 2-A.

Results—(1) *Uniform* side-wall wear; *longer* life. (2) *Full* sidewall grip on the pulley; carries heavier loads and sudden load increases without slippage — a big increase in drive efficiency — saving belt wear and also saving power!



The Concave Side is *MORE IMPORTANT NOW* Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's sidewalls.

Now that Gates *SPECIALIZED* Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

Gates
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The Mark of SPECIALIZED Research

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GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

TIMKEN 18-8 STEEL TUBES Shows the best combination of creep strength, oil corrosion resistance and oxidation resistance up to 1500°F.	**TIMKEN SICROMO 9 M STEEL TUBES** This steel possesses the maximum corrosion resistance of any of the steels below the stainless group.	**TIMKEN SICROMO 7 STEEL TUBES** For applications requiring better corrosion resistance than can be obtained with 5% Chromium type steels.
TIMKEN SICROMO 5 S STEEL TUBES For oxidation resistance to 1500°F. Good creep strength and corrosion resistance to 1300°F.	**TIMKEN 4-6% CR MO STEEL TUBES** For service up to 1200°F. Superior corrosion resistance. Less oxidation resistance than Sicromo 3.	**TIMKEN SICROMO 3 STEEL TUBES** For service up to 1200°F. Have excellent oxidation resistance and good corrosion resistance.
TIMKEN 2¼% CR-1.0% MO STEEL TUBES For service up to 1150°F. Has greater resistance to creep than 2% Cr. ½% Mo. Steel.	**TIMKEN SICROMO 2 STEEL TUBES** For service up to 1200°F., where better scale resistance is required than can be obtained with 2% Cr. ½% Mo. Steel.	**TIMKEN 2% CR ½% MO STEEL TUBES** For service up to 1150°F. Intermediate corrosion resistance plus good creep strength, fair oxidation resistance.
TIMKEN DM STEEL TUBES For service up to 1150°F. This steel offers outstanding creep strength.	**TIMKEN CARBON-MO STEEL TUBES** For temperature up to 1000°F. Improved creep strength makes it safer than carbon steel.	**TIMKEN CARBON STEEL TUBES** Generally for service not exceeding 900°F., where corrosion and oxidation resistance are not important.

12 steels with a single aim— a better LIFE/COST ratio for your tubes!

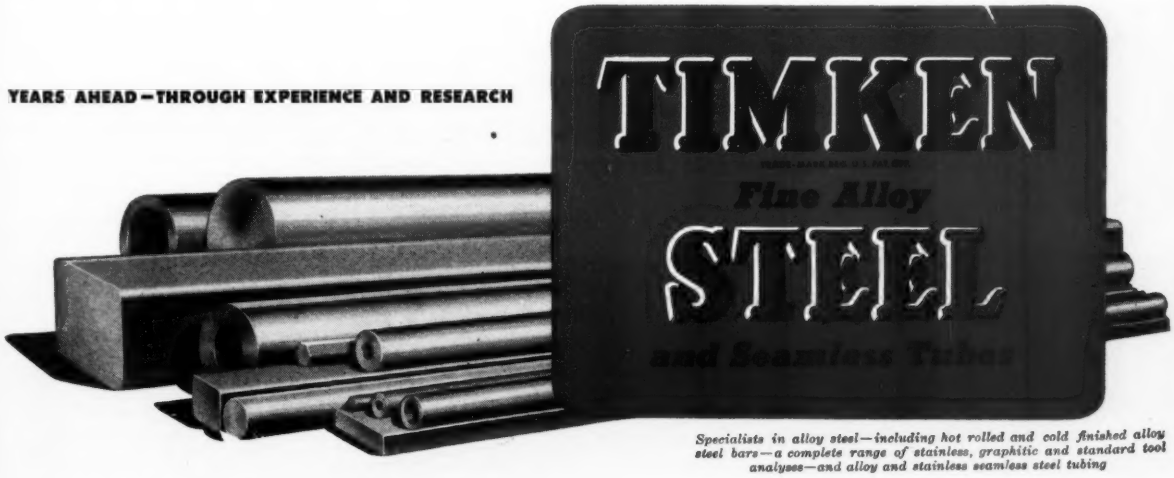
THE twelve steels listed here were developed to meet many different high temperature tube requirements. But they all have one thing in common: each will give you the best possible life/cost ratio for a particular set of operating conditions.

Which one will best solve *your* problem of heat, pressure, corrosion, or oxidation? Metallurgists of The Timken Roller Bearing Company can tell you. You can depend on their recommendations because 19 years of experience and research have made them the recognized authorities on high temperature tubing applications.

And when the correct analysis of Timken® steel has been selected, you're sure of this: Every shipment of Timken tubes is *uniform* in quality. That's assured by the rigid quality controls at every step in production at Timken mills.

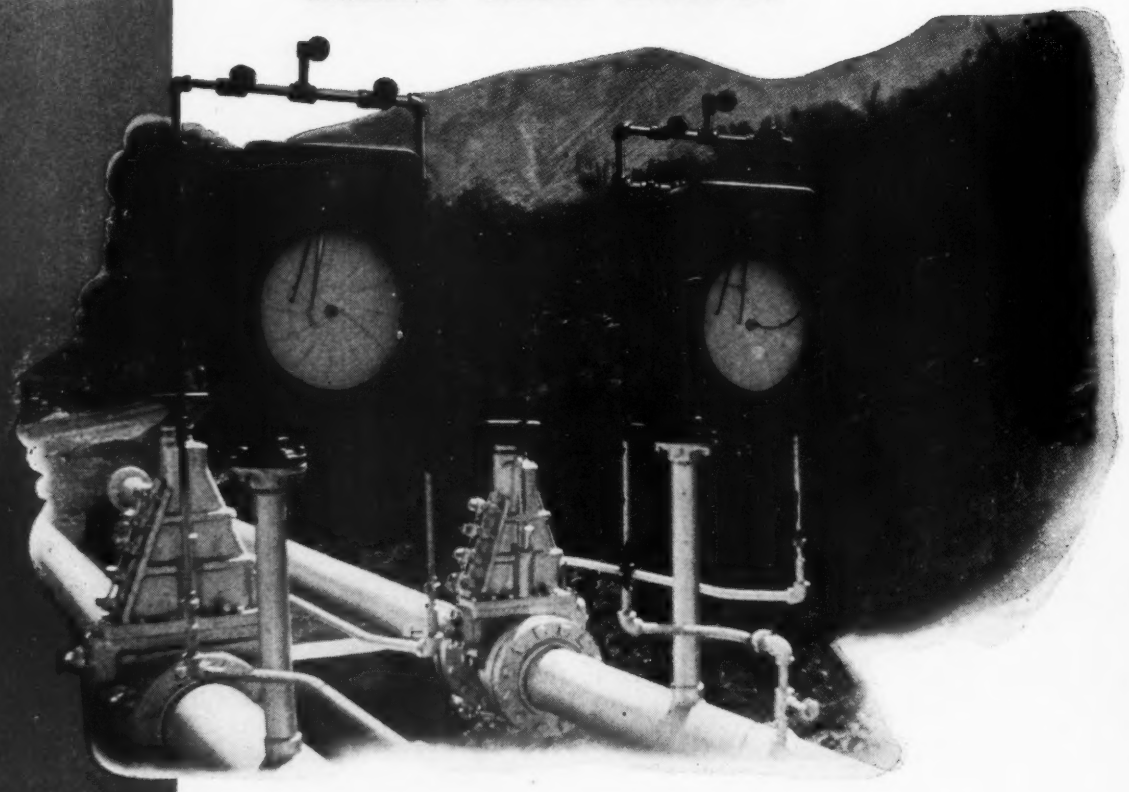
The Timken Technical Staff will be glad to study your high temperature tube problems. Call upon them at any time without obligation. For further information on Timken high temperature tubing, write for your copy of "Facilities and Products", The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

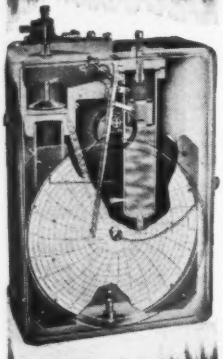
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

Where Low-Cost Accuracy Saves Time and Labor





OUT IN THE FIELD, where maintenance is infrequent and tough conditions call for dependable measurement, you'll find that METRIC American Orifice Meters pay off in low-cost accuracy.

When adjustment becomes necessary, simple, functional design makes this quick and easy. Only three tools — screw driver, wrench and pliers are needed.

The fewest possible moving parts go into METRIC American design — only one part between the mercury and the chart record. The float is simply constructed — placed on the low side to make calibration easy. Meters can be cleaned without upsetting adjustment — adjusted without interference with working parts.

METRIC American's low-cost accuracy and easy-to-service design, proved the world over, are the result of years of measurement engineering.

Technical literature, on Indicating, Recording or Integrating Flowmeters, Pressure Regulators, Liquid Level and Flow Controllers will be mailed on request.

AMERICAN METER COMPANY

INCORPORATED ESTABLISHED 1836

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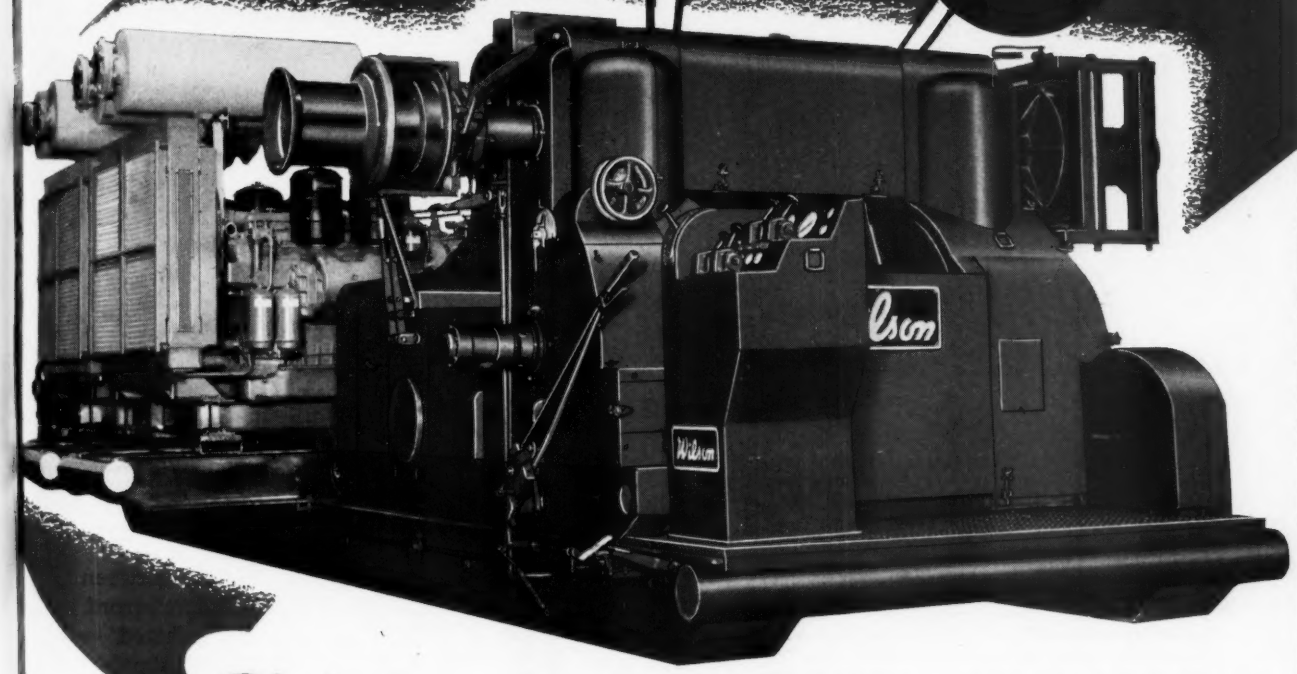
Wilson GIANT Roadmaster RIG



The last word in PORTABILITY..ROADABILITY

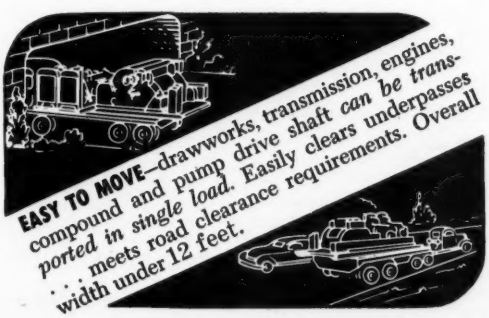
SIMPLE TO OPERATE

- PANEL CONTROL, The most convenient control system.
- SIX SPEEDS FORWARD, TWO REVERSE, with automatic speed change.

40" BETWEEN DRUM FLANGES, Line winds on fewer layers, — less cutting.

COMPLETELY CIRCULATING WATER COOLED BRAKES on flame hardened brake rings.

DIRECT DRIVEN Hydromatic Brake on separate skids, easily mounted or dismounted.



EASY TO MOVE—drawworks, transmission, engines, compound and pump drive shaft *can be transported in single load.* Easily clears underpasses . . . meets road clearance requirements. Overall width under 12 feet.

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MANUFACTURING CO., INC.

WICHITA FALLS • TEXAS

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WARNING!
STORM CHOKE SEASON AHEAD
Produce At Your Own Risk!

You can't change the weather but you can beat the calendar! Act *now* to protect yourself during the annual tornado and flood season (March, April, and May) against the costly results of wild uncontrolled flow caused by surface connection damage or failure. Provide for a dependable automatic *sub-surface* tubing shut-off by installing an Otis Removable Tubing Safety Valve ("Storm Choke") in the tubing string. Then come hell or high water, you've got it made.

Otis Removable Tubing Safety Valves consist of a simple pressure-differentially-operated type valve mechanism, equipped with a flow bean of desired size, and made up with one of three different types of lock-and-pack-off assemblies (depending upon specific well conditions). Each type is easy to run, set, service, and pull under pressure on a steel measuring line. Under normal producing conditions the valve is held open by a coiled spring. Flow course through the tool follows a single straight bore. Sealing surfaces of the valve and valve seat are out of direct line of flow, thus safeguarding critical parts against flow cutting. However, the instant surface connections fail to the extent that the upward thrust of the pressure differential across the flow bean exceeds that of the compression in the spring, the valve automatically snaps to a positive shut-off. After surface repairs have been made the tool can then be re-opened by equalizing pressures across it.

Don't wait until storm warnings go up! If you are operating wells located in vulnerable areas, begin your safety program *today* with a call to the Otis man nearest you. He is well equipped to give you a detailed description of how Otis Removable Tubing Safety Valves can provide you with dependable "storm cellar" protection.

The Type F Otis Removable Tubing Safety Valve Cage Assembly (shown in red) can be made up with one of three different types of lock-and-pack-off devices: (1) the Type J Mandrel Assembly (shown on left) which seats and locks in a Type J Otis Landing Nipple and Flow Coupling installed in the tubing immediately above the packer; (2) the new Type S Otis Mandrel Assembly (recommended for use under extreme temperature, pressure, and corrosive conditions) which seats in one of several Type S Otis Landing Nipples installed at desired depths, thus permitting the simultaneous use of Otis Removable Bottom-Hole Regulators and Chokes in the same string of tubing; or the Type B Mandrel Assembly, recommended for use under temperatures up to 180° F in wells which have not been equipped with new Type S Otis Landing Nipples.

LITERATURE AVAILABLE
Write Otis Pressure Control, Inc., Box 7206, Dallas, Texas. Ask for Bull. 48-104.

PRESSURE CONTROL – OTIS – SERVICE – EQUIPMENT

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TUBING SAFETY VALVE

(T-24)

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Illustration indicates the care with which each part is constructed for maximum service. Grades of Ampco aluminum bronze are varied for each part to deliver longest service and best performance.

It's a *special* pump at *no extra cost*

You don't have to pay special production costs for bulky, over-size corrosion-resistant pumps. Ampco's centrifugal pump is a standard production model, designed to handle corrosive and erosive liquids — for a *standard-model* price.

Check these important features:

- Casing and Volute are streamlined for efficient conversion. Heavy cross-section prevents deformation. No blind tapping to invite corrosion.
- Wearing rings are centrifugally cast of Ampco Metal—wear-and erosion-resistant to protect casing and cover, and maintain efficient running clearance.
- Strong, corrosion-resistant impeller withstands hydraulic shock, cavitation, and erosion by abrasives in suspension.
- Stuffing box is well-proportioned and extra-deep, constructed for heavy duty.
- It is the only bronze pump that can be repaired by welding (with Ampco-Trode electrodes of proper grade to match the base metal).
- All sizes available for either pedestal or close-couple mounting.

The efficiency and durability of this pump have been tested and proven in the petroleum, chemical, food-processing industries, and in breweries. We know this Ampco Pump *cuts your original equipment costs and your replacement costs.* Get complete information from your nearest Ampco Field Engineer, today!

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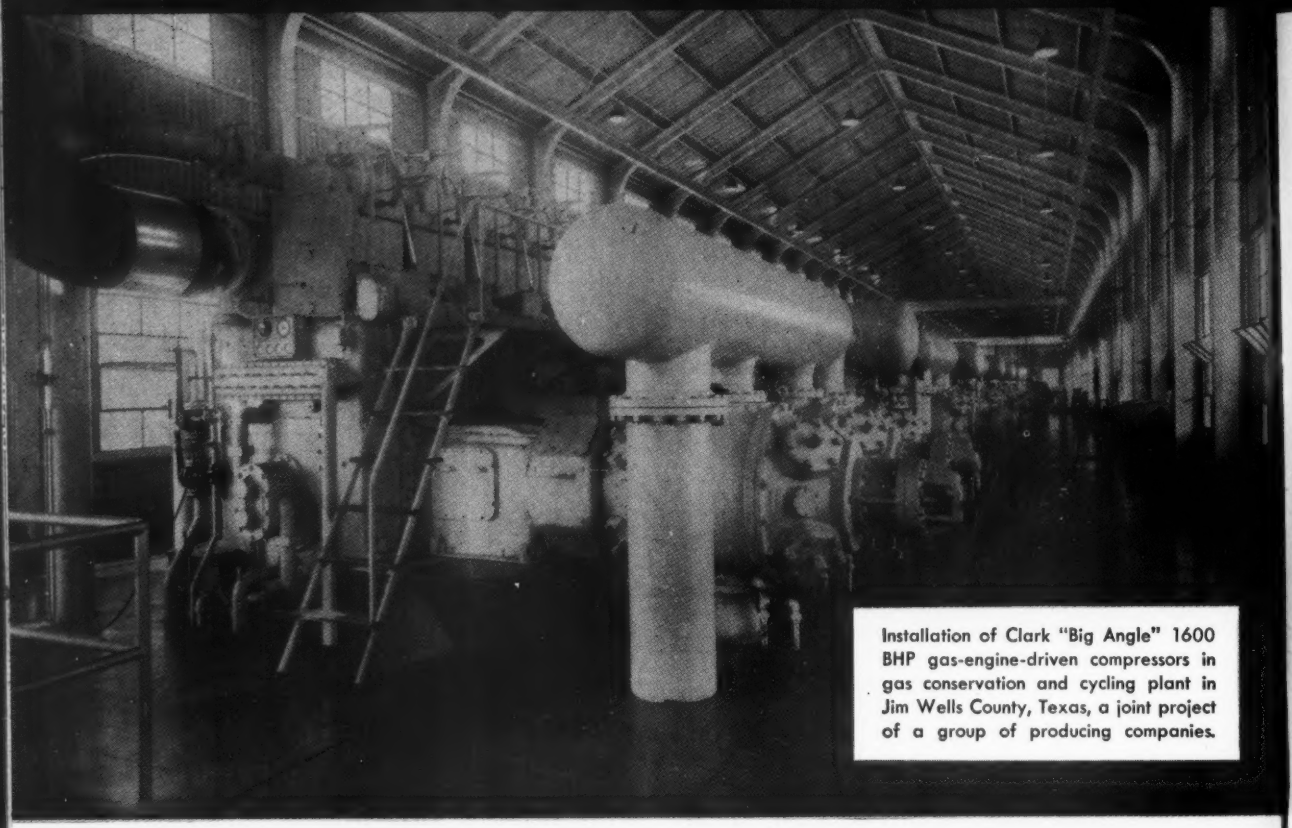
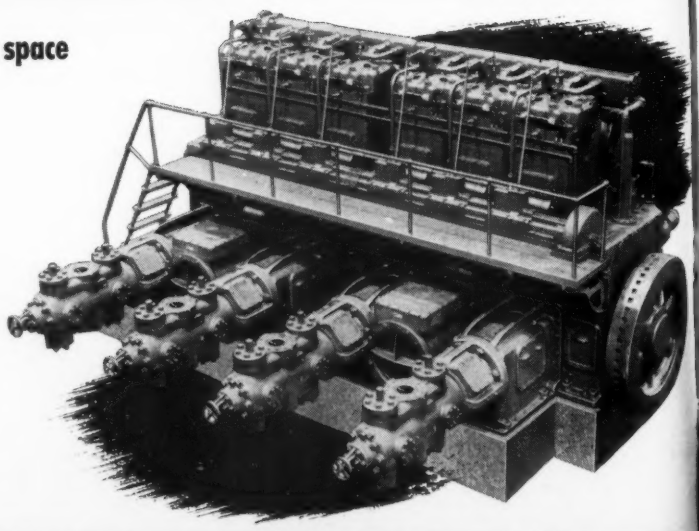
CLARK "BIG ANGLES" co



Installation of Clark "Big Angle" 1600 BHP gas-engine-driven compressors in gas conservation and cycling plant in Jim Wells County, Texas, a joint project of a group of producing companies.

"BIG ANGLES" give you more power in less space

In addition to being the most compact, heavy-duty gas-engine-driven compressor unit ever built, the Clark "Big Angle" is the most accessible. A man standing on the platform can easily reach the air starting housings, camshaft, cylinder head, bolting, spark plugs, gas injection and starting plugs. Compressor cylinder covers are large and easy to get at. Packing is easily accessible. Compact design means minimum foundation and housing requirements and ease of installation. "Big Angles" save money in installation costs and maintenance.



Whatever type of Compressor you need, CLARK MAKES IT

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CONSERVE GAS IN JOINT PROJECT
near Premont, Texas

An outstanding example of joint operation of a gas conservation program is this plant on the Seeligson Ranch in Jim Wells County, Texas. Co-operating in this project are the following companies: Magnolia Petroleum, Ramsey Petroleum, Phillips Drilling, Renwar Oil, Republic Natural Gas, Shell Oil, Sinclair-Prairie Oil, Sun Oil, Sunray Oil and Texas Gulf Producing Company.

This fine, modern plant is equipped with eight Clark "Big Angle" 8 cylinder, 1600 BHP Compressors, with more units to be added. Residue gas is derived after extraction of natural gasoline and other products from casinghead gas produced with oil. The flare gas thus conserved is compressed in three stages up to 1000 psi and discharged into a pipe line for transmission.

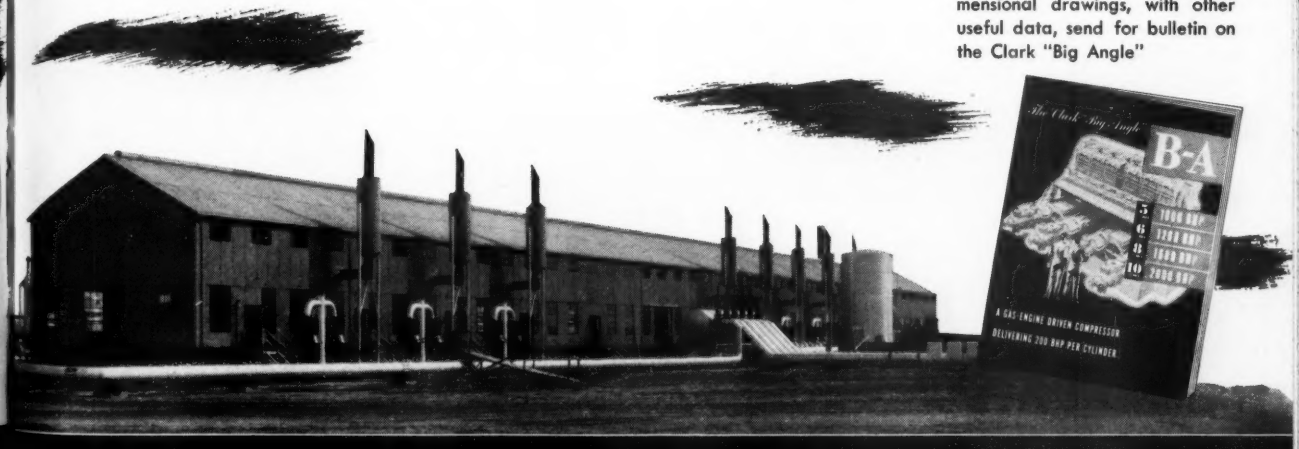
Part of the ultimate plant will also be devoted to the manufacture of natural gasoline and allied products from high pressure gas, and the return of cycled gas to the sands at about 3000 psi.

This large scale conservation and cycling project shows what can be accomplished by a unitization plan through co-operation of the various companies who have an interest in a given field.

CLARK BROS. CO. INC., OLEAN, NEW YORK

BIRMINGHAM, ALA. • BOSTON • CHICAGO • DETROIT • HOUSTON • LOS ANGELES
NEW YORK • SALT LAKE CITY • SAN FRANCISCO • TULSA • WASHINGTON • LONDON
PARIS • BUCHAREST, RUMANIA • CARACAS, VENEZUELA • BUENOS AIRES, ARG.

For complete description and dimensional drawings, with other useful data, send for bulletin on the Clark "Big Angle"



CLARK "BIG ANGLES"

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Safeguard your Production Goal with POWELL VALVES

Probably the chief reason why American Industry leads the world in productivity is the practice of setting up production goals—and then achieving them.

Naturally the achievement depends, to a large extent, on the human element; but in this technological age the efficiency of equipment—and especially flow control equipment—plays a major part.

That's why Powell builds a line of valves to meet the specific requirements of every known industrial flow control service. Furthermore, in every valve, long life and dependability have been emphasized.

So, no matter what your flow control problems may be, Powell has the answers. Write for full information on applications of Powell Valves.

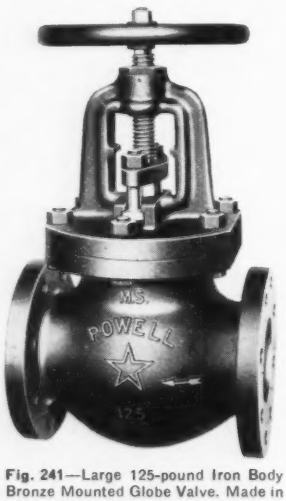
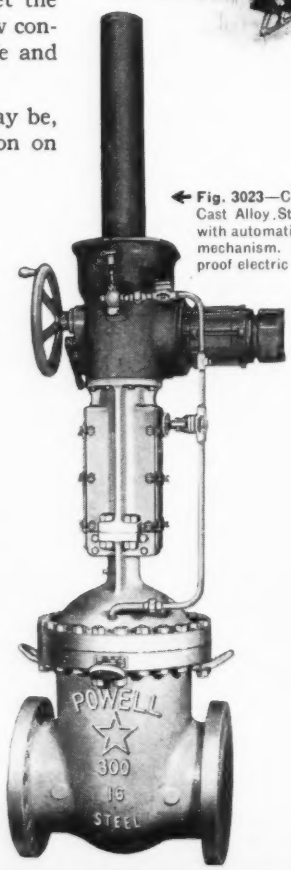


Fig. 241—Large 125-pound Iron Body Bronze Mounted Globe Valve. Made in sizes 2" to 16", inclusive. Has outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron.

Fig. 1375—200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze seat rings and disc.



← **Fig. 3023**—Class 300-pound Cast Alloy Steel Gate Valve with automatic steam sealing mechanism. Has explosion proof electric motor operator.

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", inclusive. Has outside screw rising stem, bolted flanged yoke and tapered solid wedge. Also available in All Iron for process lines.

The Wm. Powell Co., Cincinnati 22, Ohio

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POWELL VALVES

drying gases with ALCOA Activated Alumina is easy...economical!

★ ALCOA Activated Alumina is an efficient desiccant over a wide range of operating conditions.

★ The simplicity of the process substantially reduces the supervision required.

★ Equipment is simple . . . No intermediate supporting bed structures are required . . . Maintenance is low.

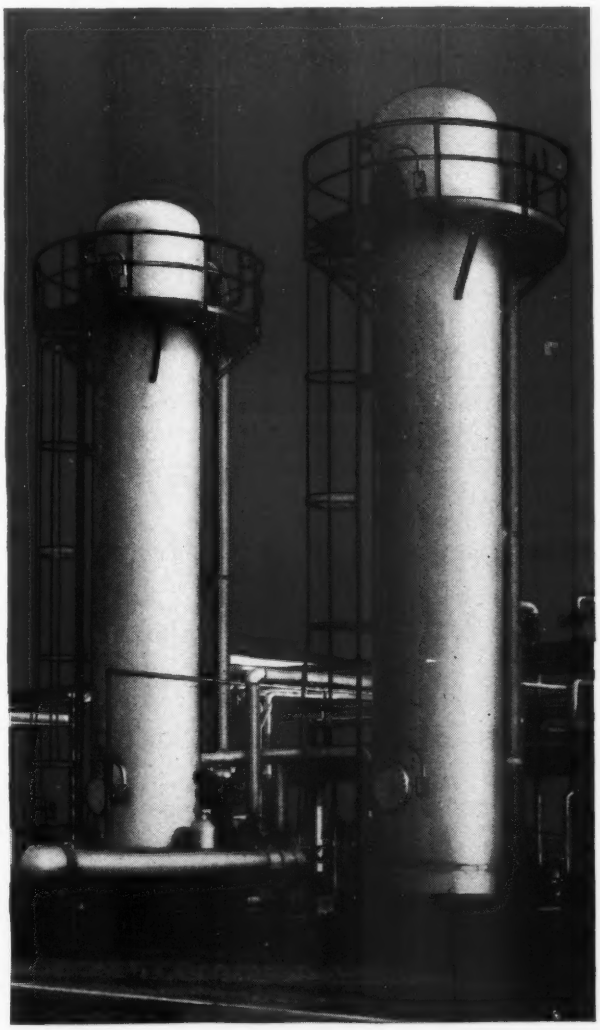
★ ALCOA Activated Alumina is produced by a chemically controlled process, resulting in a product of uniform chemical composition and physical properties.

★ ALCOA Activated Alumina packs uniformly . . . Does not swell, soften or disintegrate, even when immersed in water.

★ Successive cycles of adsorption and reactivation may be repeated an almost unlimited number of times with no appreciable effect on efficiency.

Each of the two towers illustrated is charged with 24,000 lbs. of Alcoa Activated Alumina—enough to dehydrate 50,000,000 cu. ft. per day on a 12-hour cycle. The gas, containing approximately 42 lbs. of water per million cubic feet, enters the dehydrators at 85° F. and is dried to 31° F. dew point at 800 p.s.i. Natural gas, heated to 380° F. is used for reactivation.

Whether you are drying gas to 31° F. at 800 p.s.i. or to *minus 100° F.* at 3500 p.s.i. you can obtain the desired dryness and maintain it continuously with Alcoa Activated Alumina. Let us tell you more about this *efficient, reliable* desiccant. We'll gladly furnish you with working samples. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 1967 Gulf Building, Pittsburgh 19, Pennsylvania.



Dehydrating towers at one of the newer natural gasoline plants in southwest Texas.

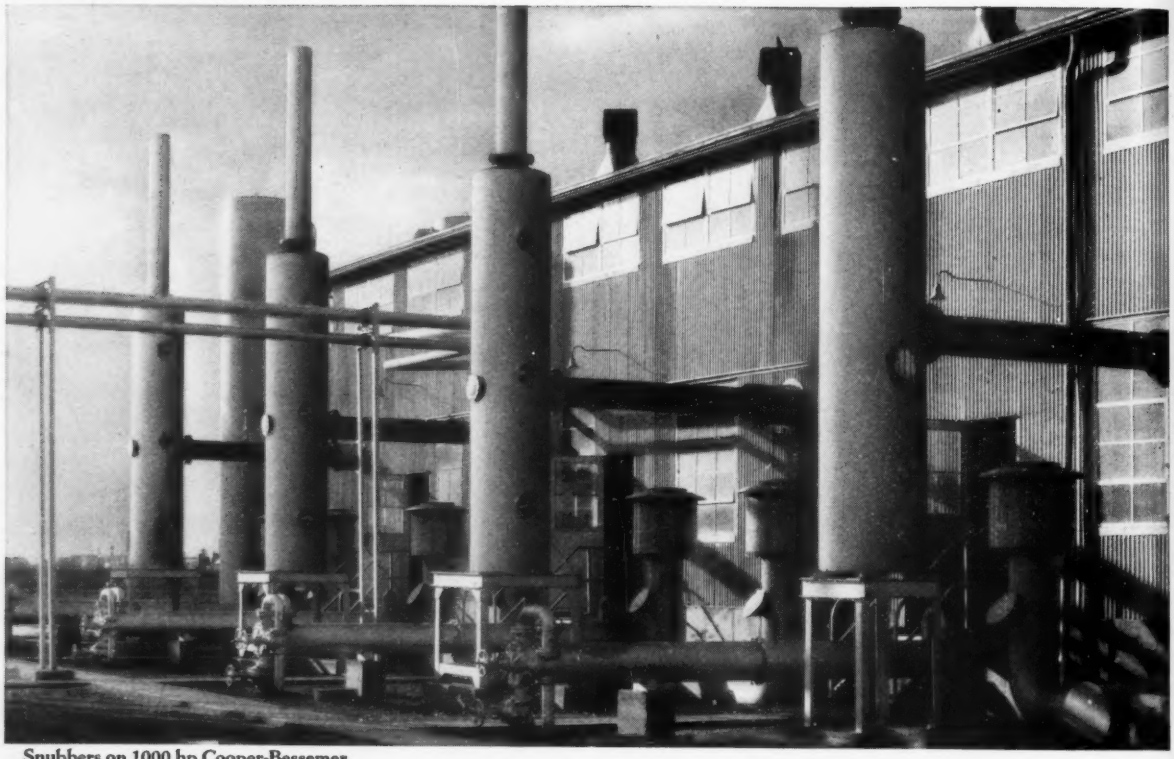
ALCOA

ALCOA CHEMICALS

ALUMINAS AND FLUORIDES

ACTIVATED ALUMINAS • CALCINED ALUMINAS • LOW SODA ALUMINAS • TABULAR ALUMINAS • HYDRATED ALUMINAS

ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE



Snubbers on 1000 hp Cooper-Bessemer engines of the Panhandle Eastern Pipe Line Company of Sunray, Texas.

Snub the Slug—and Stop the Noise

FROM DIESEL EXHAUSTS!

Diesel and other internal combustion engines can be operated anywhere . . . without exhaust noise . . . when you equip them with Burgess-Manning Exhaust Snubbers. Widely used for such critical locations as office buildings, hospitals, community installations, ships, oil fields, and industrial applications where no exhaust noise disturbances can be tolerated or where danger of explosions or flying sparks must be eliminated.

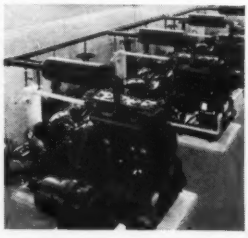
Burgess-Manning Snubbers prevent noise by dissipating the "slugs" of gas from Diesel engines . . . with no interference to high engine performance. Special "Fog-jet" Snubbers snub the "slugs" to prevent exhaust noise, scrub out glowing sparks, spray a mist of cooling water vapor on the exhaust gases entering the Snubber . . . to cool and extinguish flame from the engine.

Burgess-Manning Snubbers are designed for Diesel, gas, dual fuel, and gasoline engines used in stationary, marine, locomotive, and portable service. A wide variety of types and sizes of Snubbers is available.

If you are considering the installation of Diesel or other type internal combustion engines, or if you have exhaust noise complaints, let Burgess-Manning submit Snubber recommendations. Long experience guarantees complete satisfaction. Write for literature.

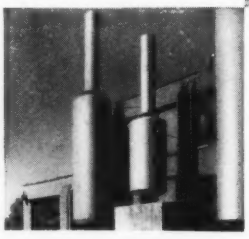
BURGESS-MANNING COMPANY

LIBERTYVILLE, ILLINOIS



Connecticut pumping station uses Snubbers to prevent noise from Diesel exhaust. No tuning of exhaust pipe length is necessary with these Snubbers. They prevent noise, regardless of position or location in the exhaust system.

The trawler "Wm. J. O'Brien" is a typical fishing boat equipped with Burgess-Manning SDM Spark Arrester Exhaust Snubbers. They remove sparks from exhaust and prevent noise. Compact construction . . . ideal where space is limited.



Municipal light plant at Oberlin, Ohio, depends upon Burgess-Manning Snubbers to suppress exhaust noise that would otherwise be very objectionable to the community.

WHAT MAKES DEHYDRATION EFFECTIVE?

SERVICE

QUALITY

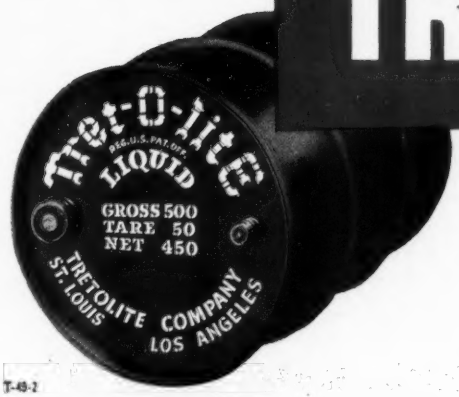
RESEARCH

Tretolite service engineers are strategically located to provide maximum service for every field.

Tretolite reagents are carefully manufactured, painstakingly checked and rechecked.

Tretolite research is a continuing effort to provide the most effective dehydrating reagents possible.

TRET·O·LITE



T-49-2

TRETOLITE COMPANY

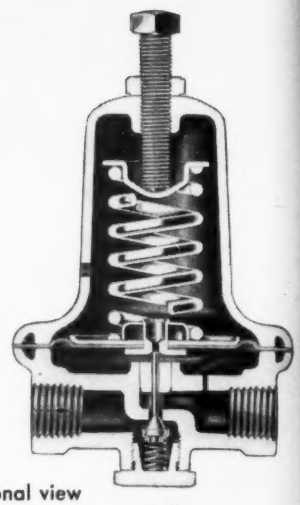
Manufacturing Chemists

ST. LOUIS 19, MISSOURI • LOS ANGELES 22, CALIFORNIA

DEHYDRATING DESALTING

The Fisher Series 67 Regulator for small volume air or gas flows is designed to furnish industry with an improved economical regulator with the ability to do an outstanding job of **accurate, efficient regulation.** It will not vibrate, chatter or sing and has capacity up to 6 C.F.M.

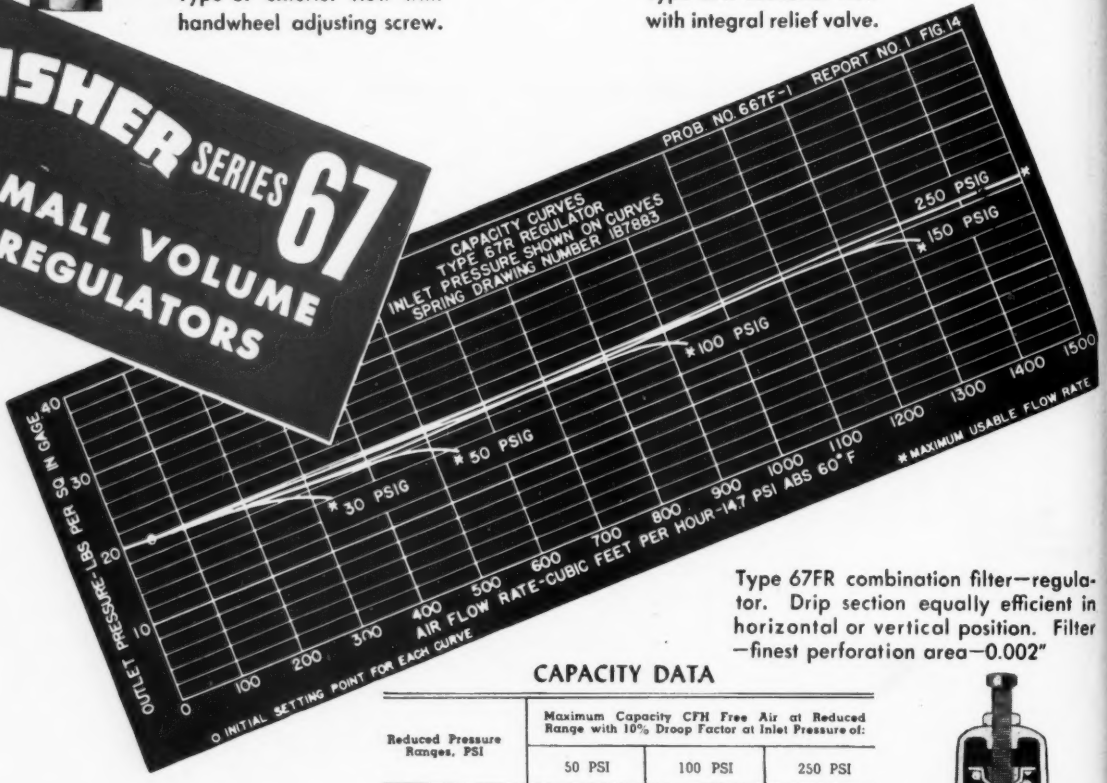
Fisher Series 67 Regulators are ideal for hundreds of miscellaneous industrial uses—they are particularly adapted to instrument air service, supplying 20 lbs. operating medium pressure to instruments and pilot operated regulators.



Type 67 exterier view with handwheel adjusting screw.

Type 67R sectional view with integral relief valve.

FISHER SERIES 67 SMALL VOLUME REGULATORS

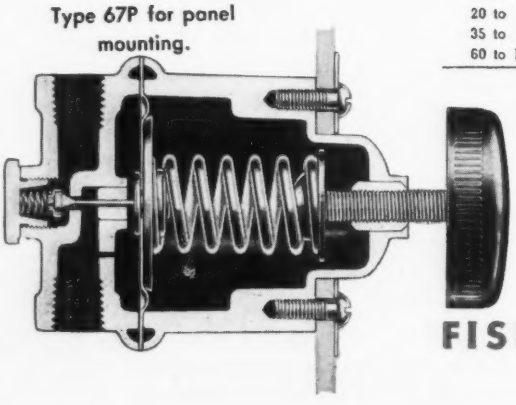

PROB. NO. 667F-1 REPORT NO. 1 FIG. 14
CAPACITY CURVES
TYPE 67R REGULATOR
INLET PRESSURE SHOWN ON CURVES
SPRING DRAWING NUMBER 187883
250 PSIG
150 PSIG
100 PSIG
50 PSIG
30 PSIG
OUTLET PRESSURE-LBS PER SQ IN GAGE
AIR FLOW RATE-CUBIC FEET PER HOUR-14.7 PSI ABS 60° F
* MAXIMUM USABLE FLOW RATE
O INITIAL SETTING POINT FOR EACH CURVE

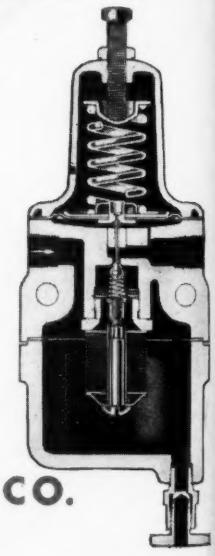
Type 67FR combination filter—regulator. Drip section equally efficient in horizontal or vertical position. Filter—finest perforation area—0.002"

CAPACITY DATA

Reduced Pressure Ranges, PSI	Maximum Capacity CFH Free Air at Reduced Range with 10% Droop Factor at Inlet Pressure of:		
	50 PSI	100 PSI	250 PSI
5 to 20	350	750	1400
20 to 35	400	750	1400
35 to 60	125	450	1400
60 to 100		350	900

Type 67P for panel mounting.





SPECIFICATIONS:

Size—¼".

Maximum inlet pressure—250 PSI.

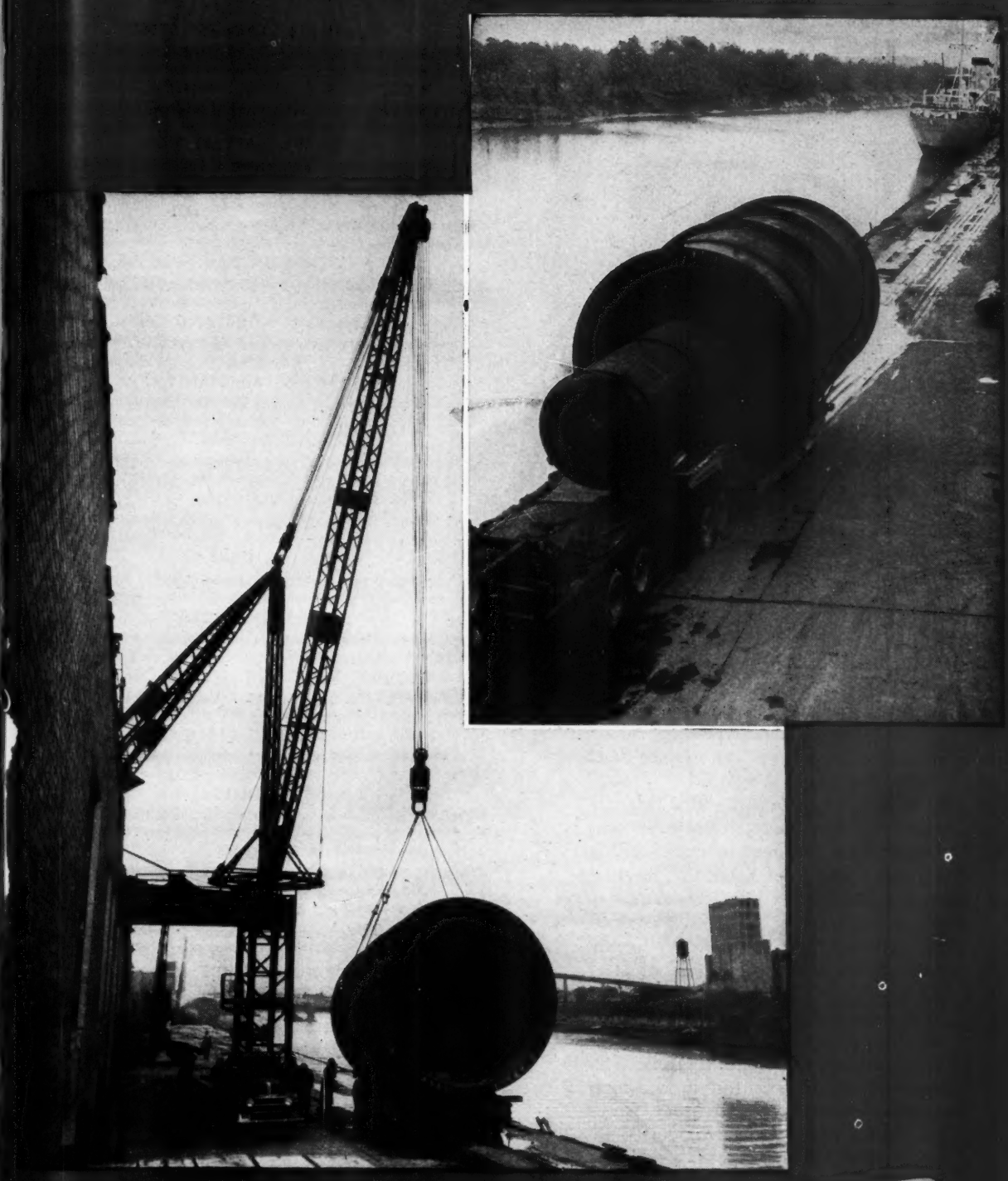
Body—Aluminum, alodine finish and painted.

Dimension—Over all height 5 5-16"—(67FR 9 3-8") face to face 2 7-8".

For further details and complete specifications write for Fisher Bulletin 67.

FISHER GOVERNOR CO.
MARSHALLTOWN, IOWA
332 FISHER BLDG.

XUM



This 15'x95' Vessel Fractionating Tower being loaded for barge delivery to one of Texas' great refineries on the Gulf Coast is typical of Wyatt's superior fabrications for the Petroleum Industry.

WYATT METAL & BOILER WORKS

STEEL PLATE DESIGNERS, FABRICATORS AND ERECTORS TO INDUSTRY'S SPECIFICATIONS

Wyatt's

HOUSTON - DALLAS

SELECT FOR YOUR EXACT REQUIREMENTS

by class or type of steel tubes from GLOBE

Yes, you can select your exact requirements — by class or type steel tubing in almost any size — from Globe Steel Tubes Company.

What's more, you can be absolutely sure of getting a product in exact conformity with your requirements. That's because Globe Steel Tubes Co., meeting your needs, applies all the manufacturing and engineering "know-how", gained by exclusive specialization for nearly forty years in the production of steel tubing.

Equally important, you get the benefit of the most advanced volume production methods and rigid controls. To maintain the exact uniformity and high quality, constant chemical and physical checks and tests are conducted by Globe Steel Tubes Co.'s own completely equipped laboratories.

If you have a problem involving steel tubes—*stainless, mechanical* or *pressure* —consult Globe Steel Tubes Co. Globe engineers will give you the benefit of their specialized knowledge in a wide range of services and applications . . . to help make your product better . . . to increase your production . . . to lower your costs. GLOBE STEEL TUBES CO., Milwaukee 4, Wisconsin.

★ SEAMLESS STAINLESS STEEL

★ GLOWELD WELDED STAINLESS STEEL

★ SPECIAL ANALYSES STEEL

★ SANITARY

★ CORROSION RESISTANT

★ POLISHED INSIDE AND OUT

★ SEAMLESS MECHANICAL

★ MACHINEABILITY

★ STRENGTH

★ CLOSE TOLERANCE

★ ANNEALED AIRCRAFT

★ GLOBEIRON HIGH PURITY INGOT IRON

★ HIGH MAGNETIC PERMEABILITY

★ DUCTILITY

★ PRESSURE

★ HIGH TEMPERATURE SERVICE

★ AUTOMOTIVE

★ CARBON

★ ALLOY

★ ROUND

★ SPECIAL SHAPES AND FORMS

GLOBE

STEEL TUBES

ALL READY *for fast make-up!*

● Why? Because Republic Electric Weld Casing and Tubing are uniform throughout every length and every shipment . . . uniform in diameter and roundness . . . with uniformly clean, accurate threads that take hold and spin up tight in a hurry.

These *modern* tubular products provide valuable underground protection, too. Uniform wall thickness . . . adequate metal under the threads . . . and sound, scale-free inside surface all combine to offer high resistance to pull-out and collapse.

Republic Electric Weld Casing and Tubing are formed only from high ductility steel. Every length is fully normalized for uniform structure. Casing is cold sized for high yield strength—additional assurance of full dependability on every job.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • • • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, both sides of which are inspected. Thus, the surface which becomes the inside wall is free from hidden defects.

REPUBLIC *Electric Weld* **NORMALIZED CASING AND TUBING**

REPUBLIC STEEL

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes

Choose the Leader . . . *For VALUE!*

CHEVROLET ADVANCE-DESIGN TRUCKS

CHEVROLET From one end of the nation to the other, more truck users buy Chevrolet trucks than any other make. Chevrolet trucks offer more of what truck users want—more power combined with economy . . . more comfort and convenience . . . greater ease of handling . . . more value from start to finish! And to all these advantages you can add the biggest premium of all—3-WAY THRIFT! Here's the one truck that combines low cost operation, low cost upkeep and the *lowest list prices in the entire truck field!*

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

Chevrolet Trucks alone have all these features

Chevrolet's 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation in Series 3800 and heavier duty trucks. Faster shifting maintains speed and momentum on grades.

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet's power-packed LOAD-MASTER ENGINE provides improved durability and efficiency in Series 5000 and 6000 models as well as the world's greatest economy for its size!

Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Uniweld, All-Steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axles in the 3600 Series and Heavier Duty Models • Specially Designed Brakes • Hydrovac Power Brakes in Series 5000 and 6000 Models • Standard Cab-To-Axle Length Dimensions • Multiple Color Options.

**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

COMPLETE "ON-CALL" STOCKS FOR YOUR SPECIALIZED METAL NEEDS

"One-call service... for on-call metals"

Geared to industry's continuous demand for specialized metals, Metal Goods' one-call service is designed to make your metal procurement easier—and more efficient. By having the metals you need "on-call" from your Metal Goods warehouse—*when* you need them—you can eliminate costly metal inventories... save storage space... reduce materials handling... and gain efficiency through simplifying your supply effort.

Metal Goods warehouses are strategically located to serve you quickly and dependably. Sheets, Plates, Tubes, Bars, Fittings and Accessories of

STAINLESS STEELS • ALUMINUM • BRASS • COPPER
MONEL • NICKEL • INCONEL

Plus... complete stocks of Condenser and Heat Exchanger Tubes and Sheets... Admiralty... "Alclad" Aluminum... 70/30 Super-Nickel, Monel... Naval Brass ... Muntz Metal... Fittings... and Accessories.

Consult your Metal Goods metallurgical specialist on the proper metal for your application.

Phone, wire or write your Metal Goods warehouse for your specialized metal needs.

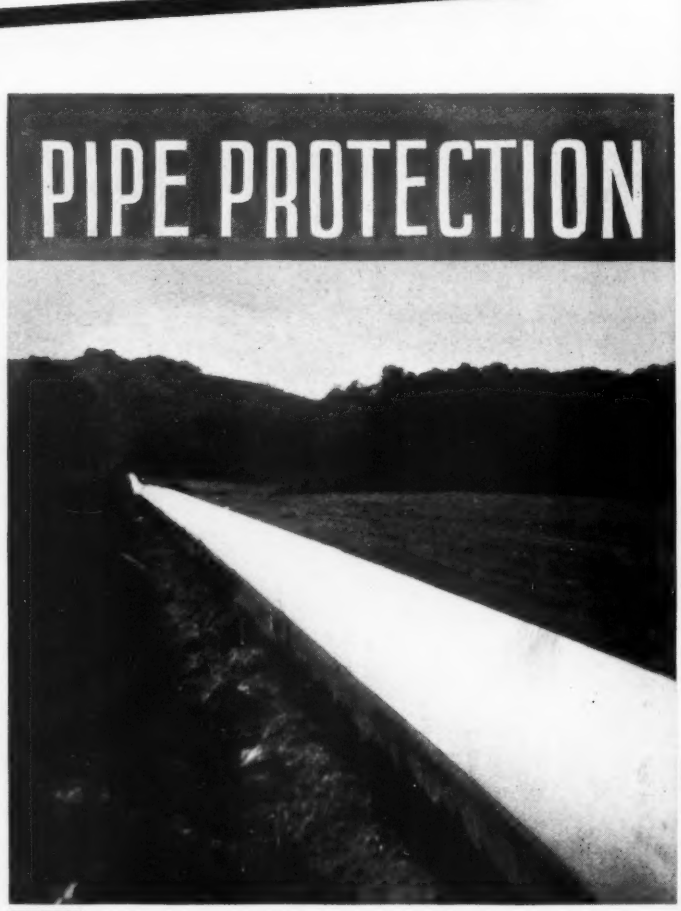
Do you have the "Metalog"? It's a complete stock list and metal manual—write for it!

METAL GOODS CORPORATION

OFFICES AND WAREHOUSES: **St. Louis,** 5250 Brown Ave. • **Dallas,** 6211 Cedar Springs Rd. • **Houston,** 711 Milby St. **Tulsa,** 302 N. Boston • **New Orleans,** 432 Julia St. • **Denver,** 817 17th St. • **Kansas City,** 1300 Burlington

OUR FIELD ENGINEER FOLLOWS UP OUR WORK!
Specify HILL, HUBBELL

PROGRESSIVE ADVANCEMENT • • •
YESTERDAY, TODAY and TOMORROW



We leave no stones unturned in our effort to render every possible service to our customers; from the latest, most modern plant facilities for coating-and-wrapping pipe of all sizes up to 30" O. D., to personal field representation by engineers trained in field practices.

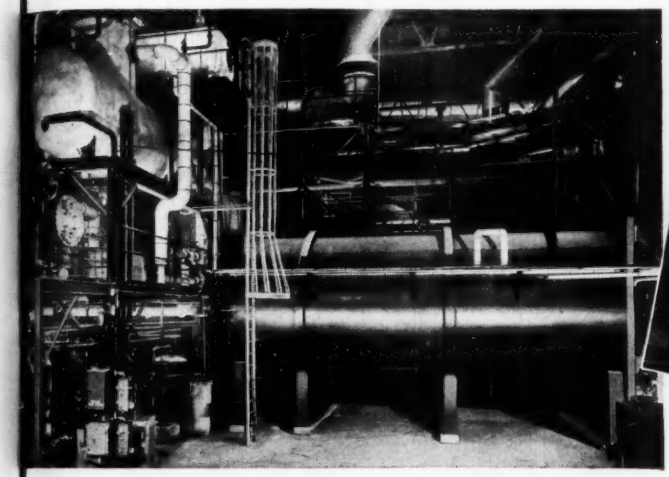
HILL, HUBBELL extra services are not confined to field representation alone, but include engineering help in your planning, storage space for your bare pipe and other services pertinent to pipe protection at its best.

Hill, Hubbell and Company
Division of GENERAL PAINT CORPORATION
3091 MAYFIELD RD. CLEVELAND, OHIO.

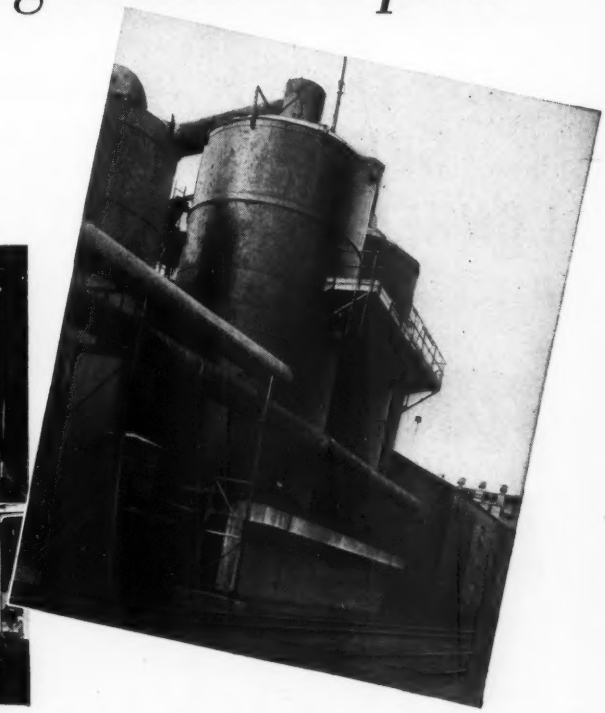
World's Largest

single unit sulfur burning contact acid plant

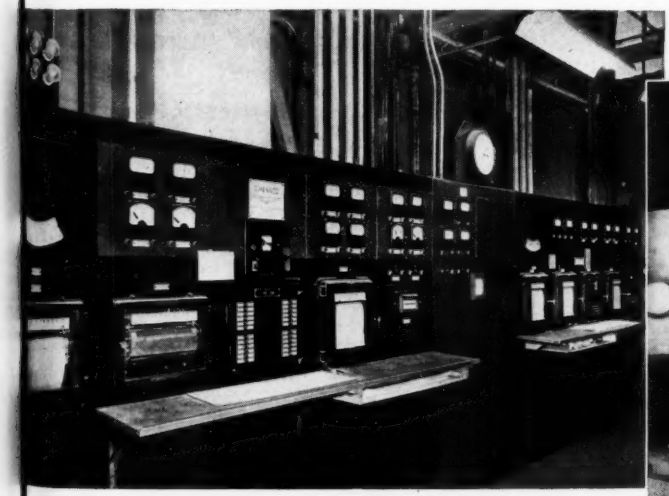
This sixth Chemico Contact Sulfuric Acid Plant for Standard Wholesale Acid and Phosphate Works in Baltimore, Md. was successfully placed in operation in December, 1948 and is regularly operating above guaranteed capacity of 500 tons per day. (100% equivalent H_2SO_4).



▲ At the right is the Sulfur Furnace with the waste heat boiler, condenser and auxiliary apparatus at the left. This furnace burns over 170 tons of sulfur a day.

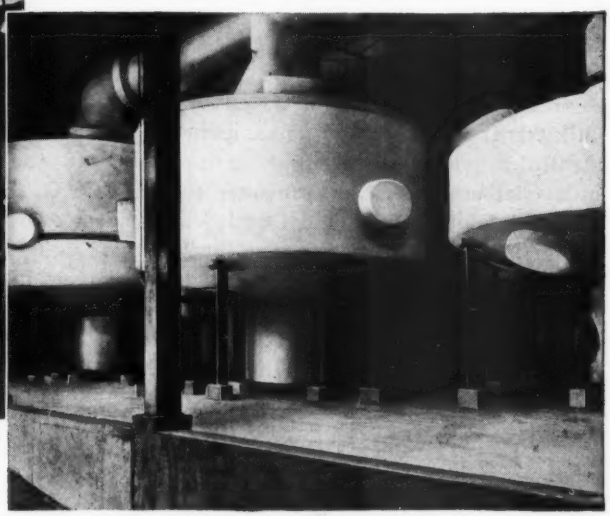


▲ Towers for the production of oleum, 98% acid and for the drying of combustion air. These are part of the drying and absorption system.



▲ Here are control panels for two of the six Chemico Contact Acid Plants. The new 500-ton plant panel is on the right.

▼ Shown left to right are the secondary converter, the primary converter and the gas filter.



CHEMICAL CONSTRUCTION CORPORATION

EMPIRE STATE BUILDING, 350 FIFTH AVENUE, NEW YORK 1, N. Y.

EUROPEAN TECHNICAL REPRESENTATIVE

CYANAMID PRODUCTS, LTD., BRETTENHAM HOUSE, LANCASTER PLACE, LONDON W. C. 2, ENGLAND

CABLES: CHEMICONST, NEW YORK

Chemico Plants are profitable investments

CC178

XUM

FIG. 400—Globe **FIG. 401—Angle**

These Valves (Non-Metallic Disc) conform to all requirements covering the use of high pressure, liquefied petroleum gases.

400 LB. W.O.G.

SPECIFY THIS LUNKENHEIMER VALVE...

FOR DEPENDABLE LP GAS SERVICE

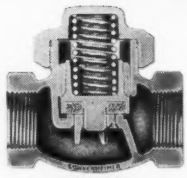


FIG. 403
LIFT CHECK WITH SPRING

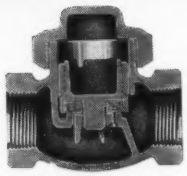


FIG. 402
LIFT CHECK

For Liquefied Petroleum Gases . . . in LP-Gas systems, bulk transfer and storage tanks, domestic cylinder charging manifolds, vapor differential compressors and the many industrial uses . . . Lunkenheimer 400 lb. W.O.G. (Water-Oil-Gas) Globe, Angle and Check Valves meet every need. Designed for this service and reflecting Lunkenheimer Quality throughout, these rugged valves have special packing and a special, easily renewable non-metallic disc. They seat tight and stay tight. These valves are approved by Underwriters' Laboratories, Inc., for LP-Gas.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO, U.S.A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 34
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

ASK YOUR LUNKENHEIMER DISTRIBUTOR

Write for Bulletin 576, or ask your distributor for a demonstration of Fig. 400 "N-M-D" Valves for Liquefied Petroleum Gases.

Lunkenheimer Distributors are located in oil producing and refining centers.

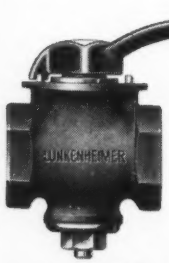


FIG. 904

LUNKENHEIMER
Bronze
Gas Throttle Cocks

Can be used in industrial plants on Butane and Propane burners, engines, etc. The diamond shaped port in the body provides extremely accurate regulation, from very fine to full flow.

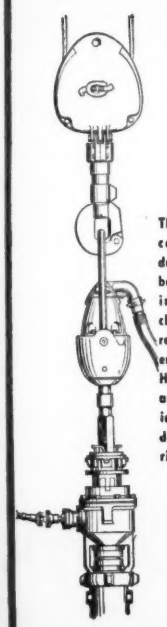
LUNKENHEIMER VALVES

Guiberson

PRESENTS THE NEW 45-TON SWIVEL

with the FULL-FLOATING WASHPIPE

Your crew will have less down-time with this new swivel, because the full-floating washpipe rotates in two independent packing glands. The unique design of this packing arrangement literally cuts wear on the washpipe in half, because rotation is in either or both packings. Life of packing and washpipe is more than doubled, and when the assembly finally needs replacing it comes out easily without moving the gooseneck or hose. No special tools are required. Roller bearings are full-sized and heavy-duty, turning in a circulating oil bath. Extra-large fluid passage is built into the gooseneck, washpipe and spindle.



The new 45-Ton Swivel completes a unitized drilling string of Guiberson Tools for drilling, work-overs and clean-out work, using reverse circulation. The entire string of Block & Hook, Swivel, Kelly and Drilling Head is ideally suited for short derricks and portable rigs.

***See** the Guiberson representative for complete information on the New 45-Ton Swivel and the complete string.*

SAFE THAN SORRY BETTER BE GUIBERSON

REG. U. S. PAT. OFF. ESTABLISHED 1919

Guiberson U. S. A.

The Guiberson Corporation DALLAS TEXAS

California Distributors: The W. R. Guiberson Co., 717 East Gage Avenue, Los Angeles 1
Export Office: 30 Rockefeller Plaza, New York 20

Branch Offices in Oklahoma City and Tulsa, Okla.; Longview, Kilgore, Houston, Alice, Odessa and Wichita Falls, Texas; Lafayette, Louisiana; Wichita, Kansas; and Newark, Ohio.

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HAVE THESE FACTS

before you buy ANTIMONIAL ADMIRALTY

CHASE

There is only one antimonial admiralty that has withstood the test of time—the admiralty patented by Chase.

An antimonial admiralty with an antimonial content of less than .007% — the minimum set forth in Chase Patent No. 2,061,921—cannot be relied upon to guard against dezincification.

•

It has been shown that while tubes with .007% antimony have been satisfactory under mild exposure conditions, a minimum of about .015% is indicated over a wide range of applications.

•

Chase Antimonial Admiralty Heat Exchanger Tubes contain nominally .035% antimony to allow for commercial variation sometimes encountered . . . and thus assure you this .015% minimum!

•

Remember, only Chase can supply you with this patented Antimonial Admiralty because only Chase can make it, and it costs no more than plain Admiralty.

Special stocks of ANTIMONIAL ADMIRALTY Condenser Tubes in Chase Warehouses at BALTIMORE, NEW ORLEANS LOS ANGELES, SAN FRANCISCO also carried by— Vinson Supply Co., TULSA Standard Brass & Mfg. Co. HOUSTON

Chase

WATERBURY 91, CONNECTICUT

the Nation's Headquarters for BRASS & COPPER

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

THIS IS THE CHASE NETWORK . . . *handiest way to buy brass*

ALBANY† ATLANTA† BALTIMORE BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT HOUSTON† INDIANAPOLIS KANSAS CITY, MO. LOS ANGELES MILWAUKEE MINNEAPOLIS NEWARK NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH PROVIDENCE ROCHESTER† SAN FRANCISCO SEATTLE ST. LOUIS WASHINGTON† (†Indicates Sales Office Only)

There's a cool $10,000,000 here...

—that won't go up in smoke!

Pack hundreds of costly furs into a storage vault—and you have an investment that takes a whale of a lot of watching!

At Merchants Transfer & Storage Co., Washington, D. C., the electric eyes of *Kidde* Smoke Detectors are *constantly* on watch. Supplemented by Heat Actuators, they send a *Kidde** automatic fire-extinguishing system into action at the first threat of fire. The system smashes the threat by flooding the vault . . .

With *water?* Not on fur coats that would turn into sodden masses! No, the *Kidde* system uses dry, clean carbon dioxide (CO_2) that's deadly to *fire*, harmless to *materials.*

The places in *your* plant where you store business documents—contracts, deeds, drawings, formulas, important correspondence—present fire hazards much like fur vaults. Your valuable papers *need* fire protection—but they're useless if water-soaked! For applications like this, CO_2 is the ideal extinguishing agent . . .

And when you think of CO_2, call Kidde!

*Also known as "LUX."

The words "Kidde" and "Lux" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Walter Kidde & Company, Inc. • 254 Main Street, Belleville 9, New Jersey

Kidde

WHERE PRESSURE PLAYS A PART

Where petroleum products must be stored under the higher pressures, Graver spheres or bullet-shaped vessels are proving their value to refineries, marketing facilities and processing plants everywhere.

Available in a full range of capacities and working pressures, Graver pressure vessels are built in strict compliance with all codes which apply and according to the latest techniques for the manufacture of either shop built or field erected tanks. Where stress-relieving, x-raying or radiographing is necessary, Graver maintains the latest in modern facilities to efficiently handle each specific requirement.

It's this close attention to details together with the most complete manufacturing facilities... backed by over three-quarters of a century of experience in steel plate fabricating... that makes Graver pressure vessels dependable.

Why not specify Graver the next time you plan petroleum storage facilities where pressure plays a part?

FABRICATED PLATE DIVISION

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

Graver offers a complete service to the petroleum industry including Expansion Roof Tanks, Floating Roof Tanks and pressure vessels. In addition, Graver is prepared to furnish specialized steel plate work such as fractionating columns and class one vessels as well as stainless and alloy fabrication; water conditioning equipment of all types; and through the Graver Construction Co., is prepared to handle all types of petroleum and chemical construction work.

GRAVER

NEW YORK • PHILADELPHIA • CHICAGO • CATASAUQUA, PA. • HOUSTON • SAND SPRINGS, OKLA.

Cuts Your Down Time

GETS YOU ROLLING AGAIN SOONER!

Example: Whether on Motors Under 200 hp, as Pictured, or as Big as the 2700 hp Motor that was Rewound and Running Again in Six Days for E. I. Dupont Co. — *Service* Stands Back of Charleston Electric Supply Co., Charleston, W. Va.

CHARLESTON ELECTRIC is a *typical* Allis-Chalmers Certified Service shop . . . the kind that is located in every major industrial center.

Yes, *you* can cut lost production time to the bone . . . get fast, expert service on motors, transformers and control by calling the authorized A-C Certified Service shop in your area whenever you need help.

A-C Certified Service Shops are hand picked from the best independent shops in industrial areas. Each meets exacting Allis-Chalmers standards for experience, highly skilled workmen, modern equipment and reputation for square dealing. Each uses nothing but factory approved methods and parts.

Ask Your A-C Dealer or Office—Most industrial areas are now served by A-C Certified Service Shops. For expert service — or for *new* motors from ½ to 25,000 hp — see your A-C Authorized Dealer or District Office. A 2615

ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS

Another APPLICATION of

ENSIGN

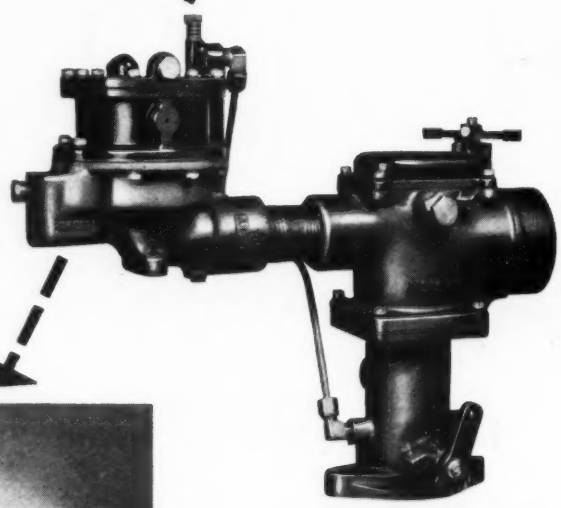
to oil field pumping engines

The Lorain single cylinder two cycle multi-fuel engine featured below and manufactured by the White-Roth Machine Corp., Lorain, Ohio, is equipped for operation on Natural Gas. The unit, typical of many such engines found in the oil fields is carbureted with ENSIGN equipment.

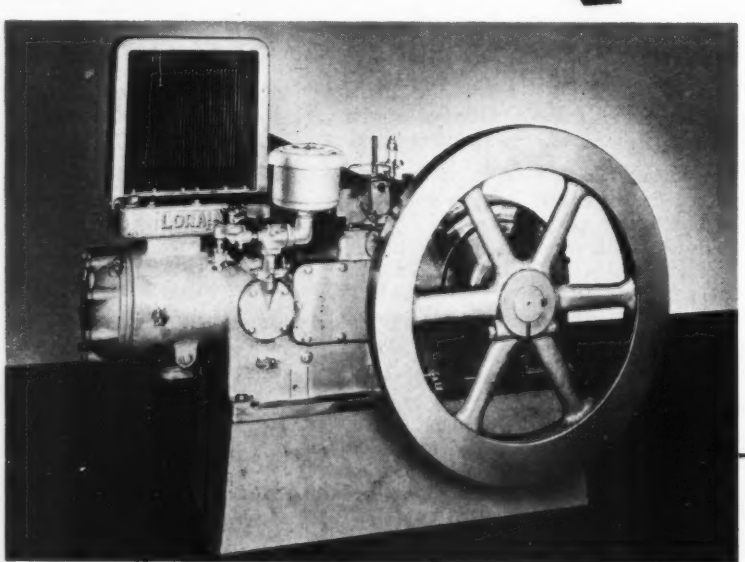
The Ensign Carburetor and Fuel Regulator function together as a single unit to assure correct air fuel ratios for easy starting and for dependable continuous performance year after year.

Engine builders and operators everywhere depend upon ENSIGN for highly efficient carburetion built to "stay put." Ensign's 38 years experience in carburetion is available to engine builders without obligation.

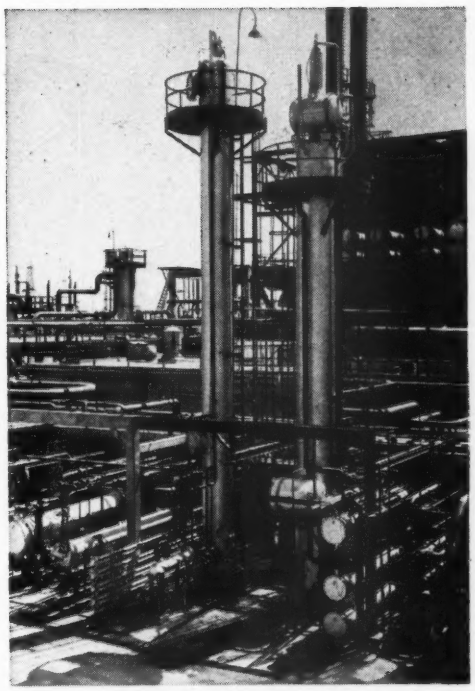
ENSIGN
CARBURETOR COMPANY
7010 SOUTH ALAMEDA ST., P. O. BOX 229
HUNTINGTON PARK, CALIFORNIA
Branch Factory: 2330 West 58th Street, Chicago 36, Illinois



Ensign "Kgl" Gas Carburetor & Model "B" Fuel Regulator



ENSIGN EQUIPPED
LORAIN
Multi-fuel Engine adapted to Natural Gas



SOUR CRUDES are an asset!

Many of the complex sulphur problems, arising from the necessity of using sour crudes, are being solved and brought under control by Girdler engineers. GIRBOTOL plants . . . some in operation for almost twenty years . . . are most effective for the removal of hydrogen sulphide from refinery gas, butane, propane, poly-feed stocks and gasoline. Operation is automatic, trouble-free and low-cost.

Take a tip from this whether you are in petroleum, natural gas, chemical or one of a dozen other fields where gaseous and liquid hydrocarbons need "cleaning up." Elimination of corrosion problems alone may pay the way.

Girdler's proved, progressive process design, engineering, and plant construction have combined *effectiveness* and *economy* in many problems involving industrial gases, gaseous and liquid hydrocarbons and organic compounds.

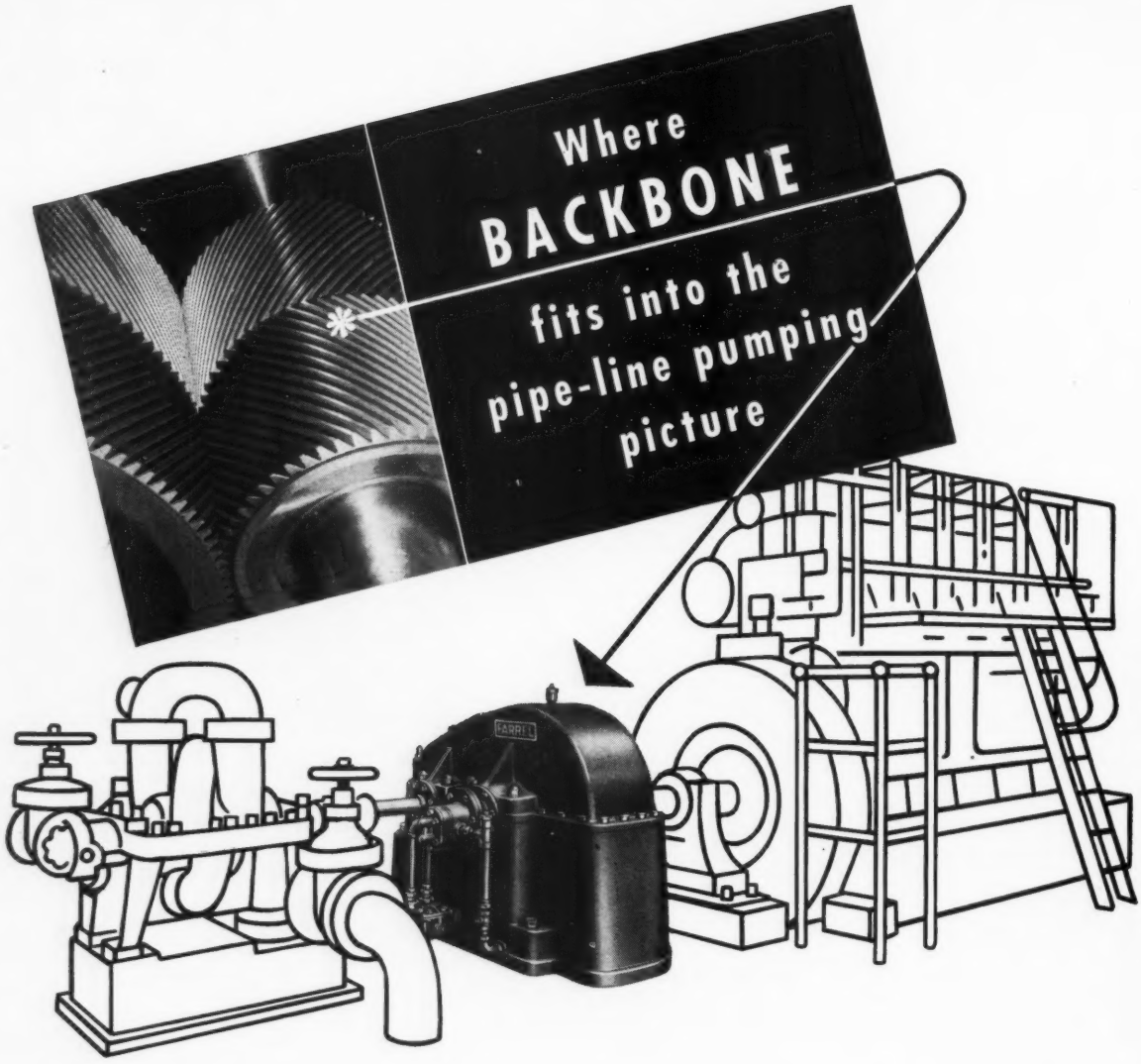
THE *GIRDLER* CORPORATION

Gas Processes DIVISION

LOUISVILLE 1, KENTUCKY

District Offices:
150 Broadway, New York City 7
2612 Russ Bldg., San Francisco 4
311 Tuloma Bldg., Tulsa 3

XUM



The gears used in Farrel speed increasers are of the continuous tooth herringbone design—the famous *Gear with a Backbone.*

Backbone, the place where the helices meet to make the teeth continuous, provides extra strength and load-carrying capacity. Since the center groove is eliminated, the entire face width of the gear is put to work transmitting power to the pump.

This design, plus the fact that the gears are *precision generated* by the Farrel-Sykes process, assures continuously smooth, efficient operation and maintenance economy – especially important in pipe-line service.

Farrel speed increasers and the *Gear with a Backbone* have proved themselves in hundreds of pipeline pumping stations since 1932 when the first units were introduced into the oil industry.

Write for *new* bulletin No. 448 which describes these units in detail.

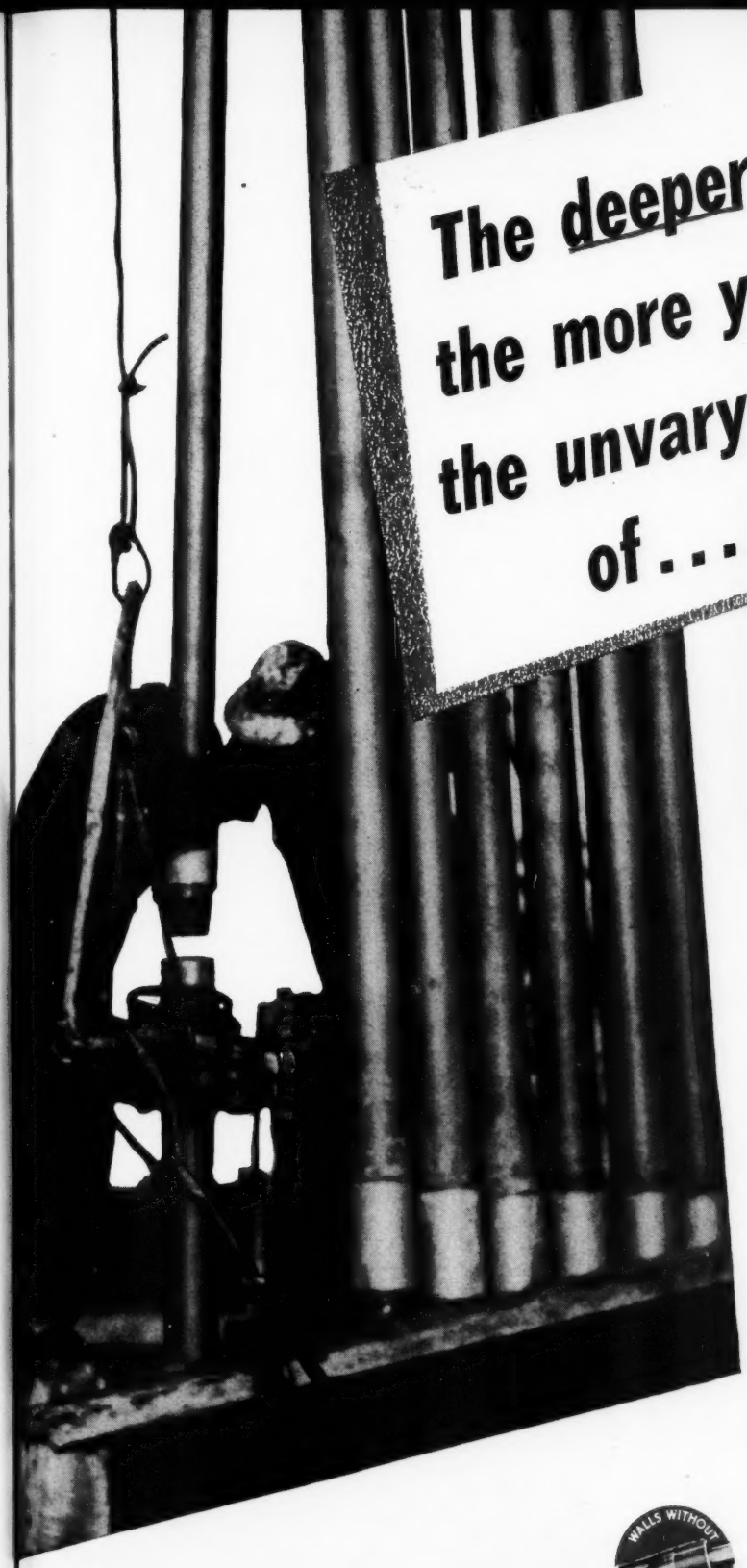
FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles.

OIL FIELD REPRESENTATIVES: Hercules-Lupfer Engine Sales Co., 124 North Boston Street, Tulsa 1, Oklahoma; V. W. Osborne, 822-A M & M Building, Houston 2, Texas.

FB-467

Farrel-Birmingham



The deeper you drill, the more you'll appreciate the unvarying dependability of . . .

NATIONAL SEAMLESS

. . . the most widely specified of all oil country goods

It's like the use of any good tool—as a job grows tougher and costs mount upward, the more you congratulate yourself on an initial stand for *dependability*. Probably nowhere are dependable tools more important than in the Oil Industry, especially in drilling, casing, and tubing the deeper wells where failure may be very costly.

Pierced from a solid billet of steel, NATIONAL Seamless drill pipe, casing and tubing have no welds . . . no line of potential weakness. They are absolutely seamless from end to end.

Improved both in steel composition and physical properties, NATIONAL Seamless Tubular Products have the same uniform wall strength and dependability throughout. Thus, you get quick, easy stabbing, smooth make-up and tight joints.

For the latest information on NATIONAL Seamless Drill Pipe, Casing, and Tubing, write National Tube Company, Frick Building, Pittsburgh, Pa. Ask for Bulletin No. 15.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

WALLS WITHOUT WELDS

USS

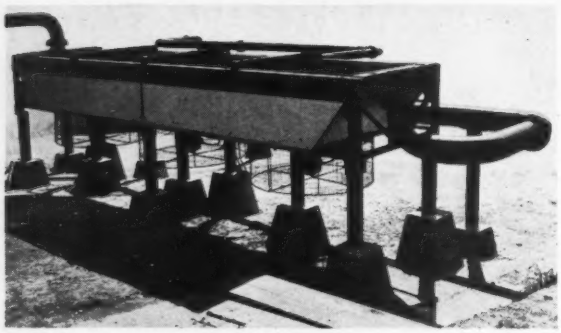
NATIONAL SEAMLESS

drill pipe . . . casing . . . tubing

UNITED STATES STEEL

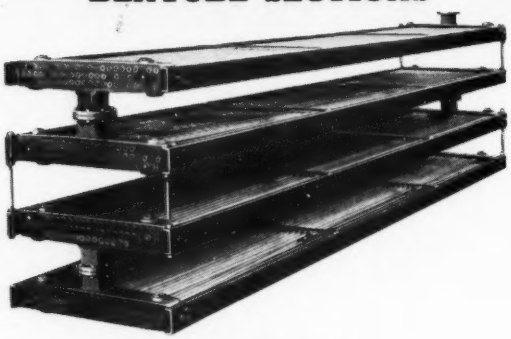
XUM

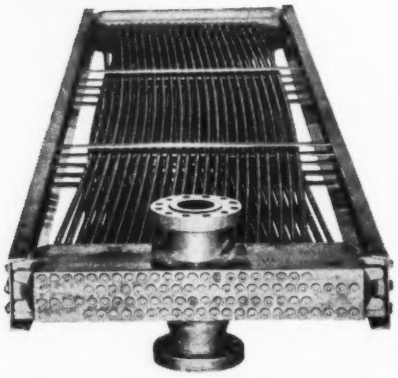
FIN-FAN EXCHANGER



A "package type" air-cooled condenser or cooler that can be installed on the ground, within a building, or on a roof, and operates independently of the direction or velocity of surrounding air currents. Upper illustration: small FIN-FAN installation operating out-doors. Lower illustration: G-R K-FIN Air-Cooled Section which provides the FIN-FAN heat transfer surface. Described in Bulletin 1231.

BENTUBE SECTIONS

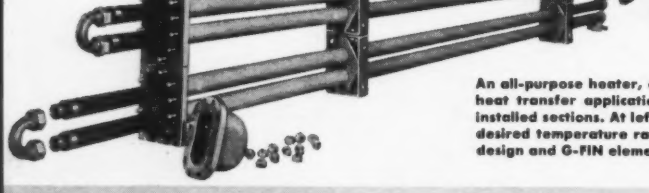




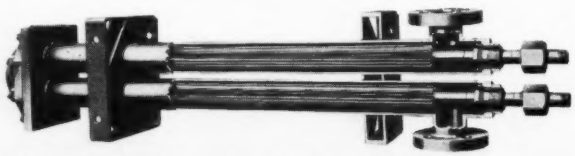
Atmospheric or submerged cooling or condensing sections with scale-shedding feature that eliminates the need for hand-scaling. Used by more than 400 refineries and natural gasoline companies. Upper illustration: stack of Bentube Sections. Lower illustration: top view of Bentube Section showing cold curvature of the Bentube elements. Described in Bulletin 1602.

G-FIN STORAGE TANK OIL HEATER

A finned-type unit with many advantages for heating viscous liquids to be withdrawn from storage tanks. At left: design for installation outside of tank. At right: design for installation partly inside of tank. Described in Bulletin 1642.



TWIN G-FIN SECTION



An all-purpose heater, cooler, condenser or heat exchanger having the widest heat transfer applications of any design on the market. More than 50,000 installed sections. At left: stack of TWIN G-FIN SECTIONS connected in series for desired temperature range. At right: cut-away view of section showing simple design and G-FIN elements. Described in Bulletin 1614.

GRISCOM-RUSSELL: PIONEERS IN HEAT TRANSFER APPARATUS

XUM

Stock Units

as well as special designs in HEAT TRANSFER APPARATUS

Besides its many special designs in heat transfer apparatus, Griscom-Russell also has *standard* designs that enable you to save time required for special engineering development and manufacturing processes.

Some of these standard units are shown and briefly explained on the opposite page. They include apparatus for practically every standard heating, cooling, condensing and heat exchange service, and for many special services . . . units with bare tube and finned tube heat transfer surfaces . . . units for cooling or condensing with water or air . . . units for heating with steam or hot liquids. Each type has thoroughly proven its effectiveness, excellent design, and sturdy construction in thousands of installations, and is based on the Griscom-Russell 80 years of experience in specializing on heat transfer apparatus.

Write for bulletins describing in detail the units that may meet your requirements for heating, cooling, condensing or heat exchange processes. Your request for further information involves no obligation.

THE GRISCOM-RUSSELL CO.

285 MADISON AVENUE, NEW YORK 17, N. Y.

GR-220A

GRISCOM-RUSSELL

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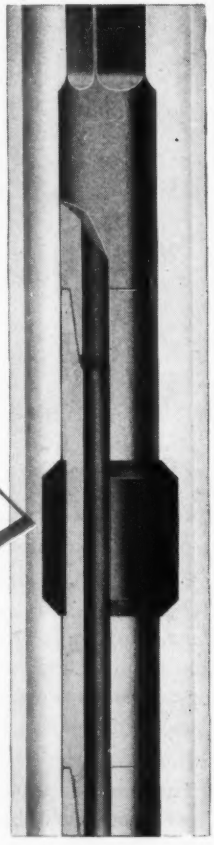
Save your Surface Casing from Kelly wear ...

WITH A...
PATTERSON-BALLAGH
KELLY SUB STABILIZER



That all-important top joint of casing stays after the drilling contractor leaves the location. There is no need for it to be almost worn through from the beating the kelly gives it. Protect your surface casing with a Patterson-Ballagh Kelly Sub Stabilizer installed on a saver sub.

Typical reasons for kelly wobble are the rotary table not being centered immediately over the casing, the crown block and traveling block not lining up with the hole, and a slight kink in the kelly. With the kelly 20′ down, a slight amount of wobble will cause a corner of it to contact the side of casing and wear it through in a short time.

With a 4¼" square kelly hanging in 9⅝" casing, as shown in the illustration on the right, the distance between the side of the casing and the corner of the kelly is 1-21/32". This is a small amount of clearance when you consider the number of causes that may make the kelly wobble. The cross section shown has a 4¼" Kelly Sub, 6" O.D., grooved to 5½", with a Patterson-Ballagh Stabilizer, Code: FLAX, installed. The 7-7/16" diameter of this stabilizer gives ample protection against wear and does not interfere with mud circulation. Install a Patterson-Ballagh Kelly Sub Stabilizer on your saver sub *today* and save your surface casing.

PATTERSON BALLAGH · SEAL OF QUALITY · OIL FIELD SPECIALTIES

Specify

PATTERSON-BALLAGH

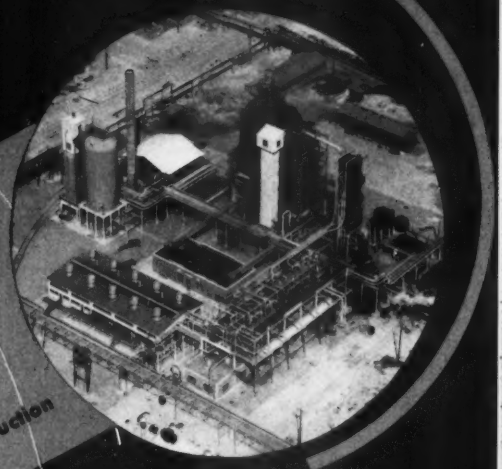
DIVISION OF BYRON JACKSON CO.

KELLY SUB STABILIZERS

MAIN OFFICE: 1900 EAST 65th STREET, LOS ANGELES 1, CALIFORNIA

6247 Navigation Blvd., Houston 11, Texas • 808 Graybar Bldg., New York 17, N. Y. • 330 Russ Bldg., San Francisco 4, Calif.
T.I.P.S.A., Santiago Del Estero 286, Buenos Aires, Argentina • H. F. Towler, 9 Cavendish Square, London, W1, England

many brains are needed



process design
mechanical design
drafting
estimating
purchasing
accounting
inspection
fabrication
construction

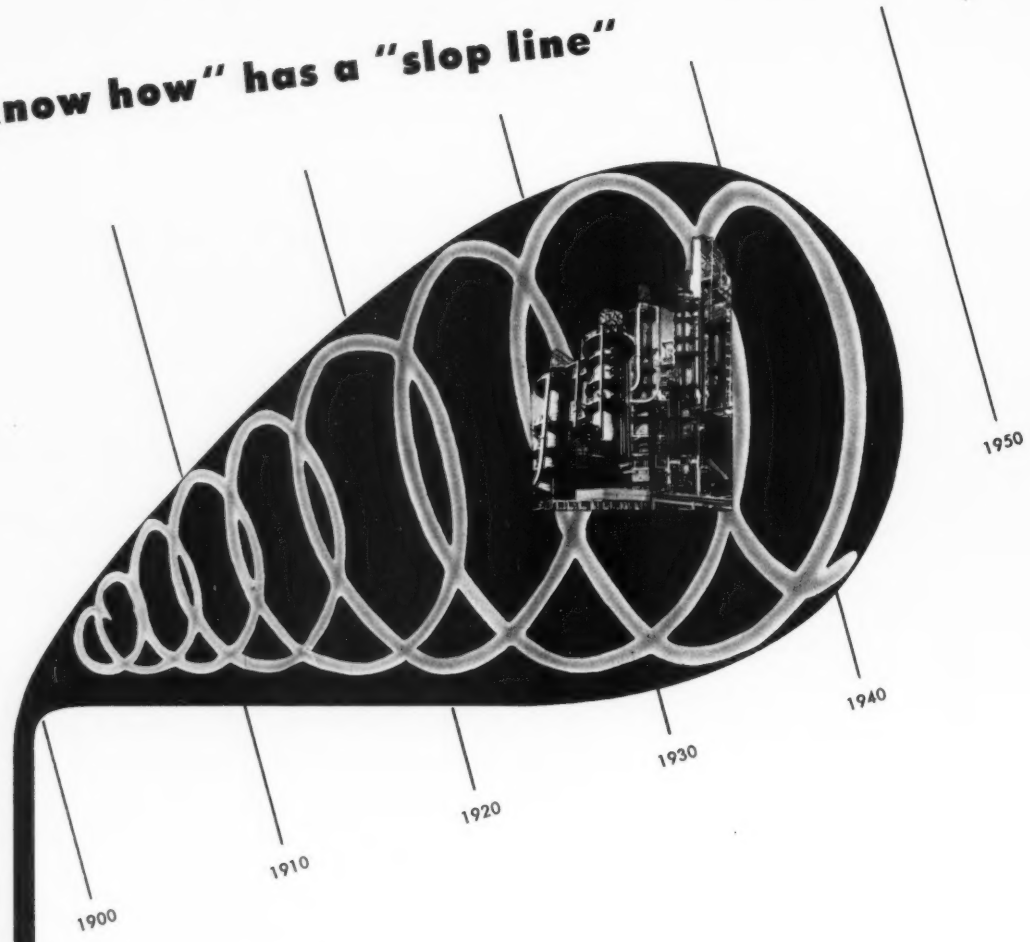
. . . and many brains—many functions—many details must be coordinated in the production of a process unit, a petroleum refinery, a complete chemical plant—a satisfied customer.

FOSTER WHEELER CORPORATION

165 BROADWAY NEW YORK 6 NEW YORK

FW

"know how" has a "slop line"



A live, active and serviceable "know how" is one which is continually undergoing revision in the light of current knowledge—the obsolete must be drawn off.

Foster Wheeler's "know how", the refined concentrate of nearly 50 years' engineering experience is an invaluable asset in the planning and building of process units, petroleum refineries and complete chemical plants.

FOSTER WHEELER CORPORATION

165 BROADWAY, NEW YORK 6, NEW YORK

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Now WHELAND has QUADS

LUCEY

DESIGNS are identical. The only variation is in their size and rated load capacities to give you a swivel suited to your particular job.

Manganese vanadium spherical steel body provides maximum strength with minimum weight.

Wash pipe, special nickel alloy steel, carburized, wearing surface heat treated to 600 Brinnell, precision ground, honed and polished for maximum smoothness and minimum packing wear.

Timken main load bearing with radial above and thrust below to maintain perfect stem alignment and balance.

4 WHELAND SWIVEL SIZES

Model E-6100 — Capacity 65 Tons at 100 R.P.M.
Model E-6200 — Capacity 131 Tons at 100 R.P.M.
Model E-6600 — Capacity 175 Tons at 100 R.P.M.
Model E-7000 — Capacity 232 Tons at 100 R.P.M.

IN ALL DOMESTIC FIELDS

JONES & LAUGHLIN SUPPLY CO.

TULSA, OKLAHOMA

LUCEY EXPORT CORPORATION

233 BROADWAY . . . NEW YORK 7, N. Y.

Broad Street House, London, E. C. 2, England · Calle Defensa 370, Buenos Aires, Argentina · 711 Sterling Buildings, Houston 2, Texas · [illegible]

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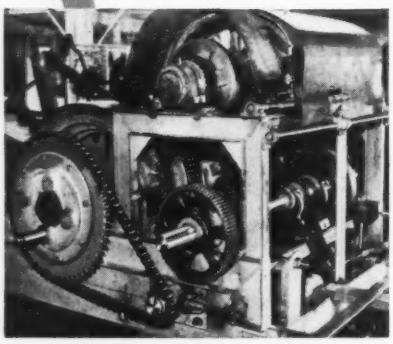
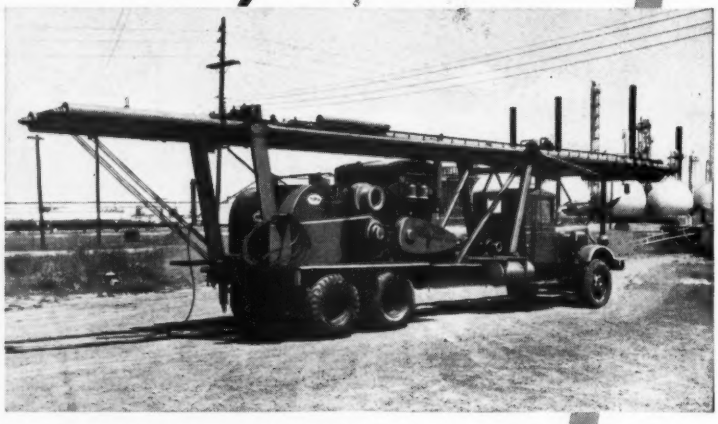
MORSE Roller Chain *fits the picture*





Morse Roller Chain—flexible, rugged, economical — meets the exacting demands of the best petroleum equipment manufactured. It is used on this truck-mounted 4000′ single drum rotary Wichtex, made by the Wichtex Machinery Company, Wichita Falls, Texas.

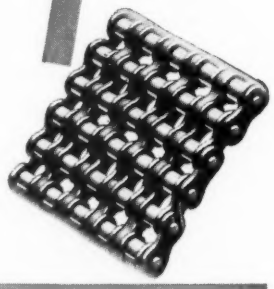
ALMOST any petroleum equipment can improve its performance picture by the use of Morse mechanical power transmission products.

Here's just one instance where this is proved. Morse Roller Chain, used by the Wichtex Company in its single and double drum rotary drills, helps to maintain top performance through dependable power transmission.

Petroleum equipment manufacturers choose Morse Roller Chain time and again for their mechanical power drives. They know it will stand up under the gruelling punishment machinery must take in drilling operations. And they know it to be an efficient, flexible drive which gives long, trouble-free service life and low-cost, positive power transmission.

Morse Roller Chain is manufactured in all American Standard pitches and widths. Morse sprockets embody Morse's designing and engineering skill. Mass-production facilities and modern equipment result in accurate quantity production at low cost.

Check on Morse Roller Chain for possible improvement in the mechanical power transmission in your equipment. And remember that replacement chains are immediately available in distributor's stocks near-by. Write for details, Dept. 308, Morse Chain Company, Detroit 8, Michigan.



Morse Morflex Coupling

MORSE

MECHANICAL

POWER TRANSMISSION

PRODUCTS

A PRODUCT OF B-W BORG-WARNER

Morse Silent Chain Drives

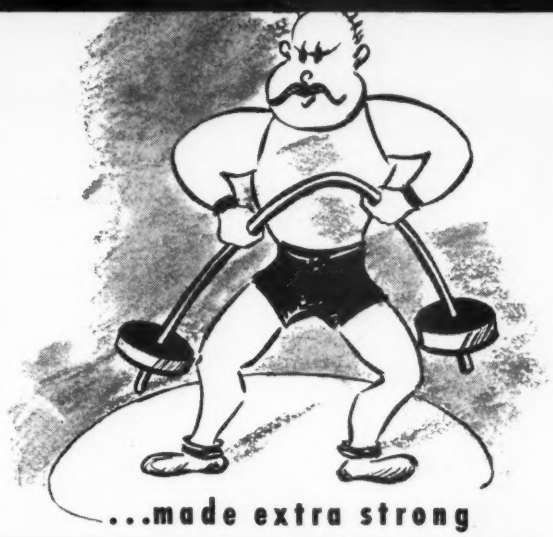
Morse-Rockford Clutches

Morse-Rockford Pullmore Clutches

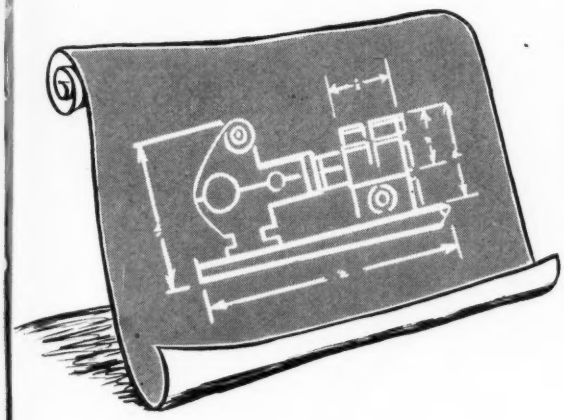
MORSE CHAIN COMPANY DETROIT 8, MICHIGAN

BRANCH OFFICE AND WAREHOUSE, 1308 LA BRANCH, HOUSTON, TEXAS

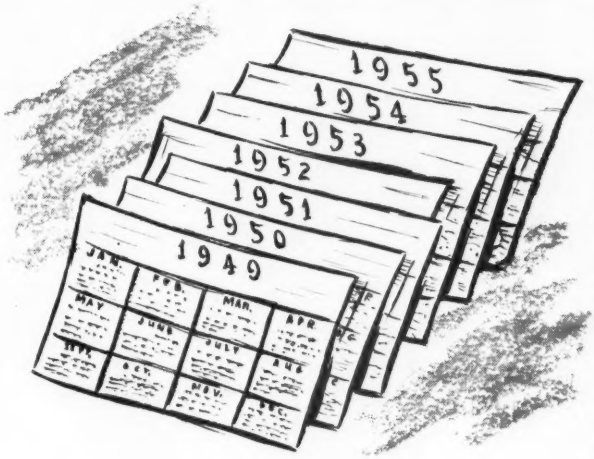
Fewer parts



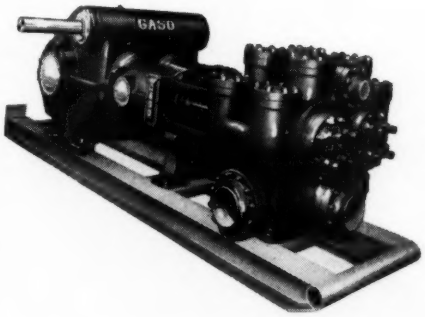
...made extra strong



+ time-tested design



= longer life



+ the utmost in pumping satisfaction

Simple Arithmetic

ADDS UP TO-

GASO PUMPS

for every oil industry need

GASO PUMP & BURNER MFG. CO.

TULSA OKLAHOMA, U. S. A.

Export Office: 149 Broadway, New York. Shreveport and Odessa: W. L. Somner Co.
Los Angeles: Production Equipment Co. Inc. 651 E. Gage Ave.

XUM

MARSH GAUGES

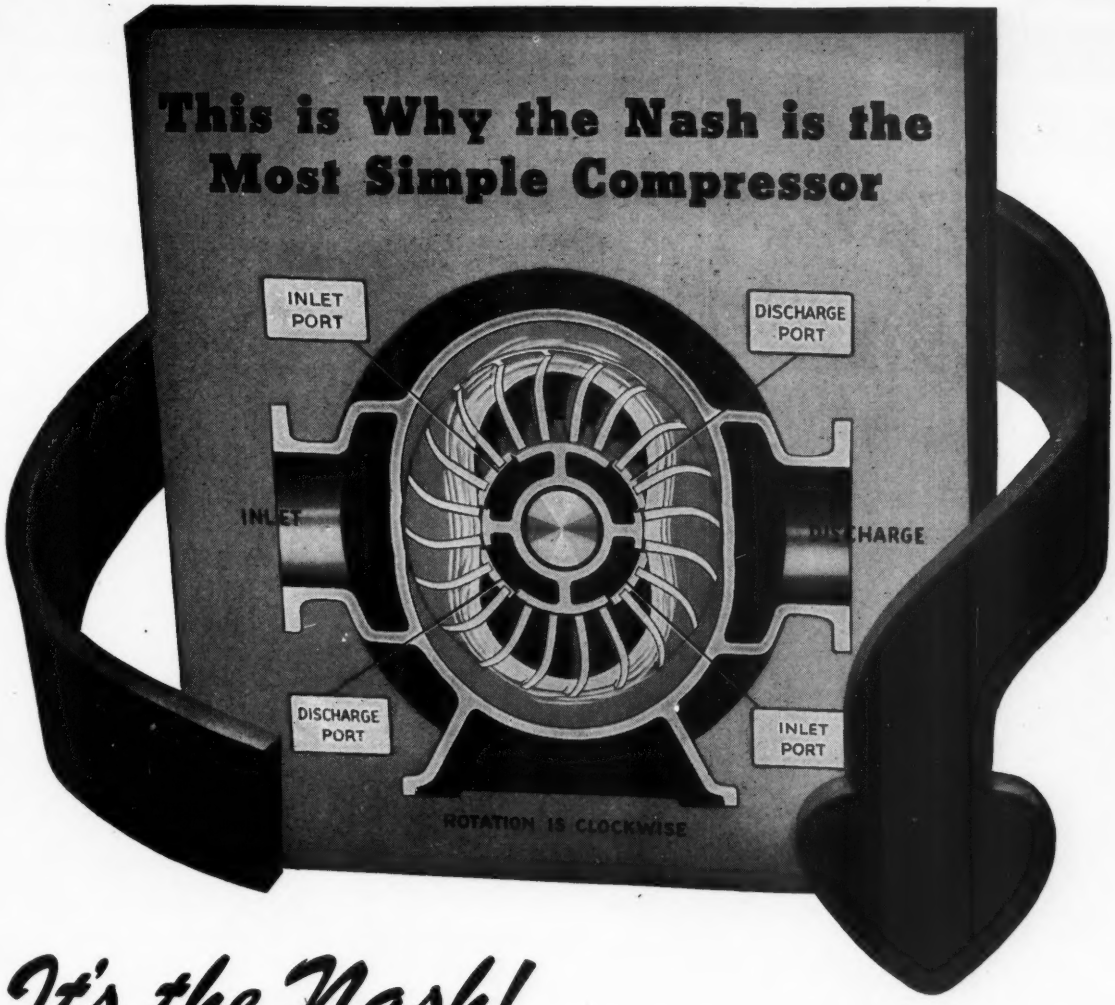
Under the grind
of daily service
Marsh Gauges
stand out
as the kind that
maintain
their accuracy.

JAS. P. MARSH CORPORATION
DEPT. L, SKOKIE, ILLINOIS

The Jas. P. Marsh line includes gauges especially designed for blenders, boilers, burners, capping, Christmas trees, columns, heaters, hydrogen units, instrument panels, pumps, Reid vapor bombs, scrubbers, separators, mud pumps, stills, towers, and other applications including oxygen and welding gauges.

XUM

This is Why the Nash is the Most Simple Compressor



It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
322 WILSON, SO. NORWALK, CONN.

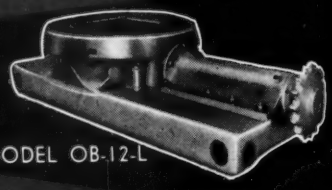
WELL AFTER WELL

FIELD AFTER FIELD

YEAR AFTER YEAR

Superior Performance

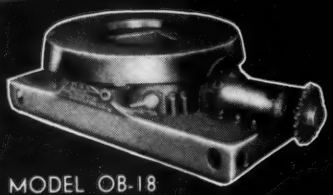
BREWSTER MODEL OB ROTARIES



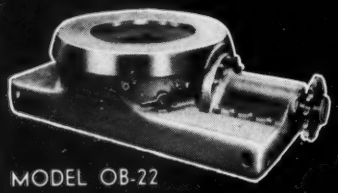
MODEL OB-12-L

MODEL OB-12-S

Compact, and rugged, the OB-12-S has all the engineering features of the larger OB rotary models. Full 12" table opening. C/L of table to C/L of sprocket is only 29"



MODEL OB-18



MODEL OB-22

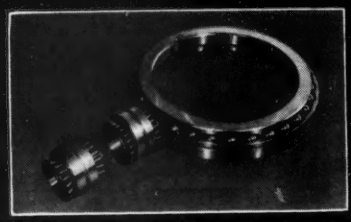


Table bearings: Angular contact roller bearing
Pinion shaft: Double-row tapered roller bearing

AMPLE BEARING CAPACITIES

FAST SAFE TABLE LOCKS

LARGE OIL RESERVOIRS

4 MODELS—3 SIZES

BREWSTER MODEL OB ROTARIES	OB-12-S	OB-12-L	OB-18	OB-22
Table Opening	12"	12"	18"	22"
Rated Deadload Capacity	100 tons	100 tons	167 tons	265 tons
Recommended Drilling Depth (with 4½" pipe)	3,000'	3,000'	6,000'	10,000'
Gear Ratio	4:1	4:1	4:1	3.03:1
Recommended Max. Table RPM	300	300	300	300

Write for Catalogs

Sold by:
APEX EQUIPMENT CO.
BOYAIRD SUPPLY CO.
INDUSTRIAL SUPPLY CO.
MURRAY BROOKS, INC.
REAMS SUPPLY CO.

THE BREWSTER CO., INC.
Manufacturers of Drilling Equipment Since 1910
SHREVEPORT, LOUISIANA, U.S.A.

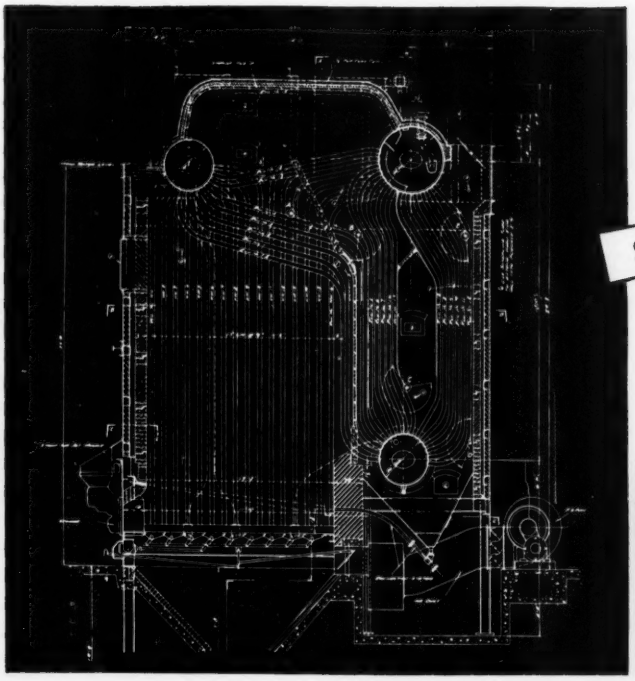
Export Sales: BAIRD SUPPLY CO.
420 Lexington Ave., New York 17, N. Y.

In Canada: HALEY SUPPLY CO.

BREWSTER
Drilling Equipment

XUM

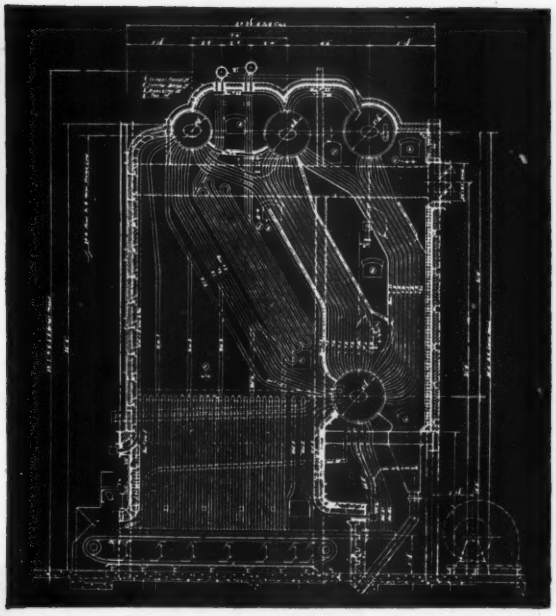
Quick Steaming at all Ratings!



Carry high overloads with high efficiency

SPECIFY **Vogt**

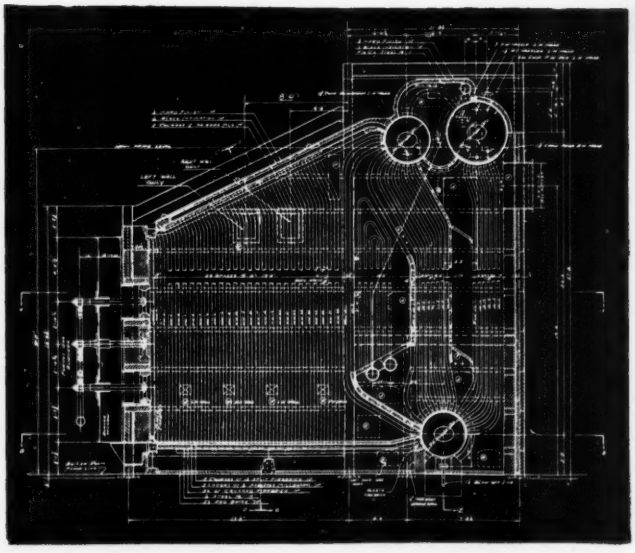
STEAM GENERATING UNITS



CLASS VL — Two 27,500 pounds per hour units, installed at Brown-Forman Distillers Corporation, Louisville, Ky. Features large furnace volume in limited space, with high ratio of radiant heating surface.

CLASS LE — Mt. Carmel Public Utility, Mt. Carmel, Illinois, is served by this 60,000 pounds per hour unit. Generous steam liberating surfaces and steam space permit wide fluctuations in load.

CLASS VR — 70,000 pounds per hour steam generator at Humble Oil and Refining Company, Johnsue, Texas. An efficient, high-duty unit with water cooled furnace, using refinery gas fuel.



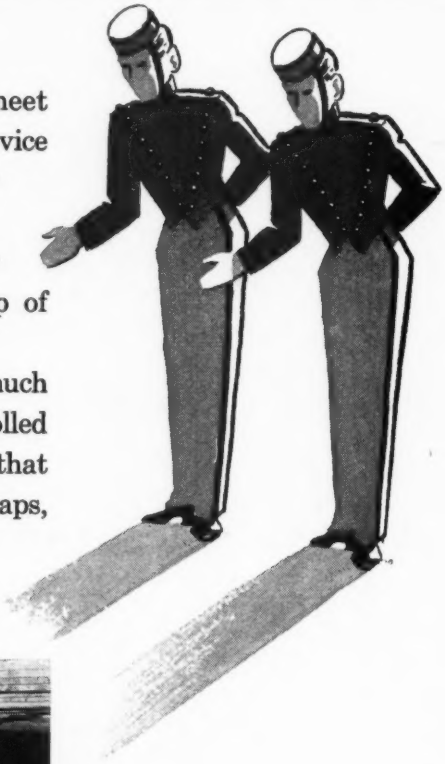
Vogt builds a complete line of bent tube steam generators, designed to burn solid, liquid, or gaseous fuels to meet specific operating conditions. Superheaters, air preheaters, economizers, water walls, and soot blowers can be readily incorporated. Bulletins with general information and showing typical installations are available upon request.

HENRY VOGT MACHINE CO.

LOUISVILLE 10, KENTUCKY

BRANCH OFFICES:
NEW YORK, PHILADELPHIA, CLEVELAND
CHICAGO, ST. LOUIS, DALLAS

HE IS DOUBLY SERVED
WHO GETS HIS STEEL, and
GETS IT... when he wants it



International has helped many manufacturers meet their supply problems by providing dependable service in de-coiling, flattening, cutting, and pickling, or by coil slitting.

Here you will find such equipment as is used by the mills . . . the most modern, independent setup of this kind in the Midwest.

International — like everyone — has none too much steel. But, if you have available tonnages of hot rolled coil, International can process it for you on a basis that will assure a dependable, steady supply . . . and, perhaps, save you money. Ask about our service.

International's Flying Shear de-coils, flattens, cuts accurately to length. Coil slitter may be seen in background.

STEEL SERVICE INTERNATIONAL

International

ROLLING MILL PRODUCTS CORPORATION

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XUM

Note this difference
The illustration shows you how each wire and each strand in
Preformed Wire Rope
is preshaped to the position it assumes in the finished rope. As a result, Preformed lasts longer, handles easier, is safer to use, and saves installation time.
Take advantage of the savings Preformed wire rope offers. Ask your supplier about it. Then specify Preformed wire rope on your next order.

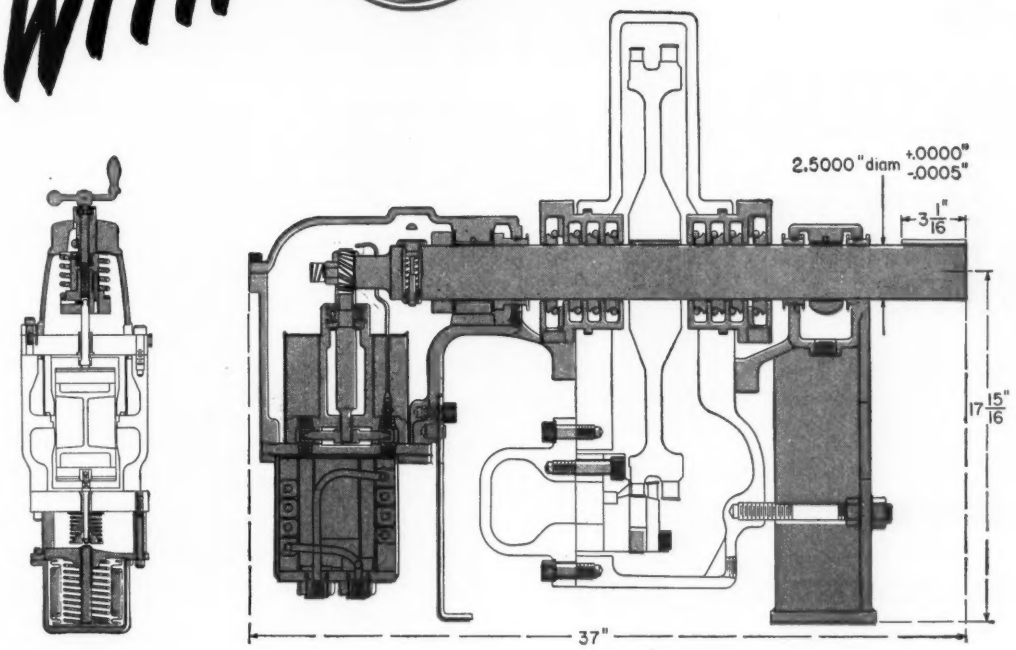
HERE'S HOW YOU SAVE

SAVE ON SPARE PARTS because of high degree of interchangeability of the new Type DP line. (Cross-section drawing shows parts interchangeable on all frame sizes.)

You can reduce your spare parts inventory with this standard kit, containing parts applicable to *all* standard Type DP turbines. With this set of packaged spares *you save 75%* of price of comparable set of loose spares for previous designs.

With the DP you save money on first cost too. Only G.E. offers hydraulic governing (30% adjustable speed range) on a standard turbine — at no extra cost.

WITH GE TURBINES



PARTS IN COLOR INTERCHANGEABLE ON ALL FRAME SIZES

SAVE TIME when installing DP turbines or when re-locating them in your plant. (Drawing shows dimensions common to all frame sizes.) Standard shaft height permits you to use a fixed mounting height on all your turbine drives. Standardization of the DP saves time on deliveries too—shipment time is approximately 20 weeks.

When it comes to alignment, you'll appreciate the DP's center-line support — now standardized on all frame sizes. Center-line support eliminates mis-alignment resulting from expansion from normal heating.

SAVE TROUBLE because of superior design features of the new Type DP — features such as: totally enclosed governing system protected in an oil atmosphere against rusting and sticking (particularly a problem on standby units); nonsparking overspeed trip, suitable for explosive atmospheres; new long-life solid-backed bearings; Monel-sprayed shaft at packings to eliminate corrosion; positive pressure lubrication; balanced valve design, and many other improvements to reduce maintenance.

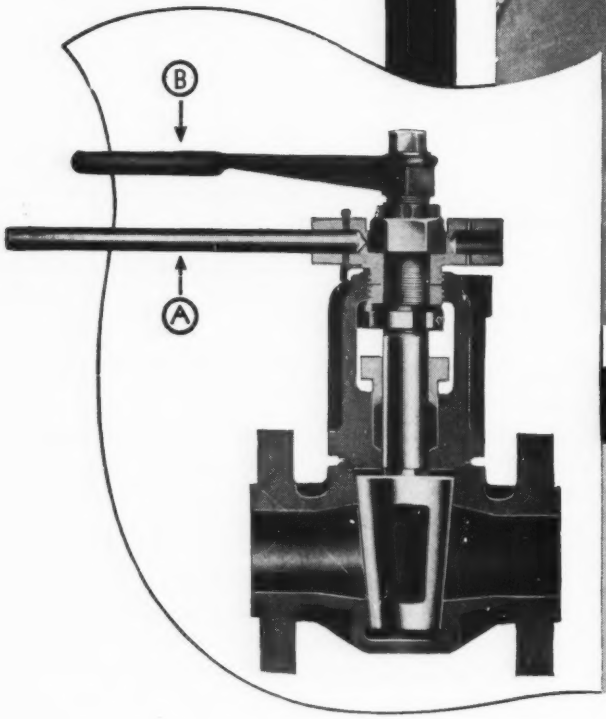
The new Type DP is not a "standard turbine" for a narrow range of ratings only, but a standardized *line*, in ratings from 10 to approximately 1200 hp, speeds from 1000 to 5000 rpm. Thus, if your turbine drives fall within this wide range, you can save money — time — and trouble — by standardizing on the Type DP. For full information get in touch with your G-E representative. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

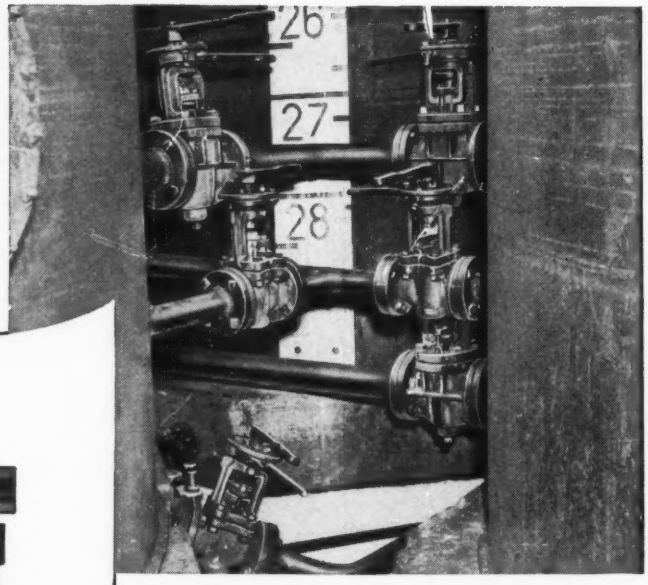
GENERAL ELECTRIC

252-31

"Instant, Stick-Proof Operation *at all Times, Under all Conditions*"

with HOMESTEAD Lever-Seald Valves





NOTE THESE OUTSTANDING FEATURES

1. Instant Stick-proof operation.
2. Quarter-turn fully opens or closes.
3. Positive seal without lubrication.
4. Seating surfaces always protected in both open and closed positions. Corrosion practically eliminated.
5. Unobstructed straight-line fluid flow.
6. All operating parts protected from damaging effects of service conditions and weather.

A powerful lever-and-screw device—built into each valve—prevents sticking and assures positive action at all times and under all conditions. Corrosive or viscous fluids, temperatures as low as 40° below Zero or as high as 1120° F., pressure or other adverse conditions that ordinarily cause valve failures, cannot affect the operation of Homestead Lever-Seald Valves.

Homestead Lever-Seald Valves operate faster too, 16 to 28 times faster than screw-stem-type valves. Seating pressure is first relieved with the lower lever "A" just enough to overcome friction. Then a quarter-turn of the upper lever "B" fully opens or closes the valve. Full seating pressure is again applied with the lower lever to make a positive, leakless seal.

Homestead Lever-Seald Valves can be furnished in combinations of metals and alloys to suit your requirements in sizes 1½" to 10", for pressure from vacuum to 1500 pounds.

Write today for full information and copy of Section 3, Valve Reference Book No. 39.

HOMESTEAD VALVE MANUFACTURING CO.

P. O. BOX 403 CORAOPOLIS, PA.

R/M Style No. 121

R/M High Pressure Packings

For steam applications in the oil field, pipe line, and refinery service, R/M offers you a variety of tested, high quality packings.

R/M High Pressure Packing (Rubber Back)—Style No. 121—consists basically of asbestos cloth over a resilient core of asbestos and rubber. It is widely used for expansion joints, piston rods and valve stems on steam engines, air compressors, and steam pumps.

R/M High Pressure Packing (Center Core)—Style No. 122—consists of a heat-resistant, resilient, rubber core covered by bias-cut asbestos cloth, lubricated and graphited. It is recommended for reciprocating steam or air rods and valve stems. Also available with wire-inserted cloth.

R/M High Pressure Packing (Solid)—Style No. 124—is similar to Style No. 121, except that it is manufactured solid, without any core, for service in air and gas compressors and similar applications.

Whatever your packing, gasket, or sheet requirements, consult your R/M catalog and call your authorized R/M packing distributor.

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Packing Division, Manheim, Pa. | FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.

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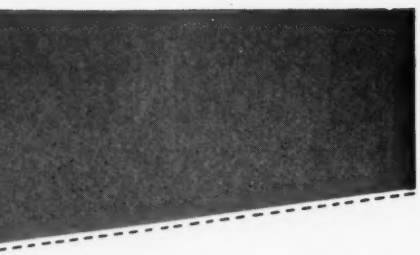
RM

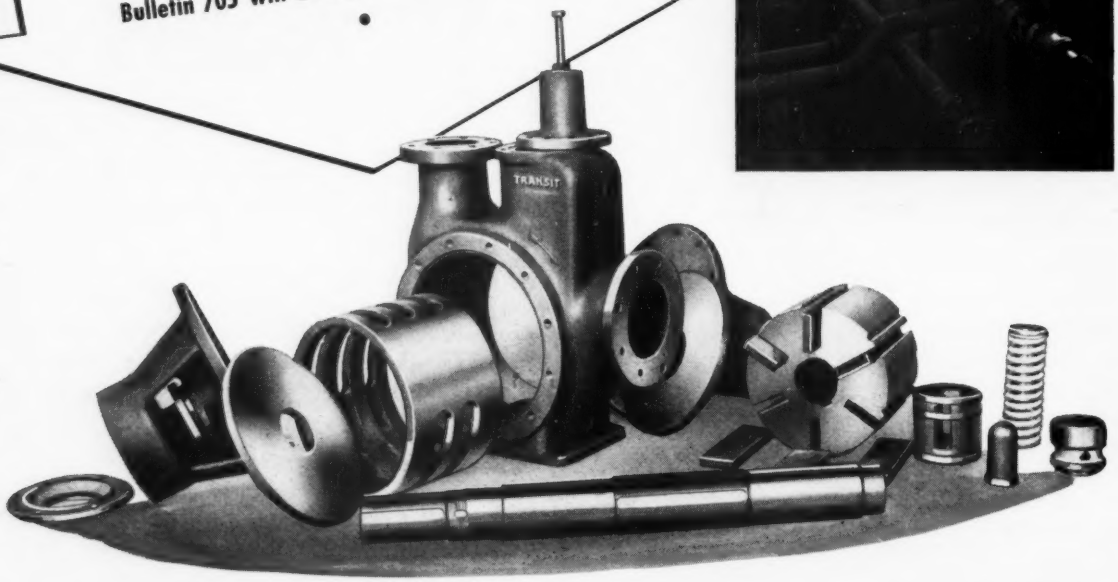
SIMPLICITY

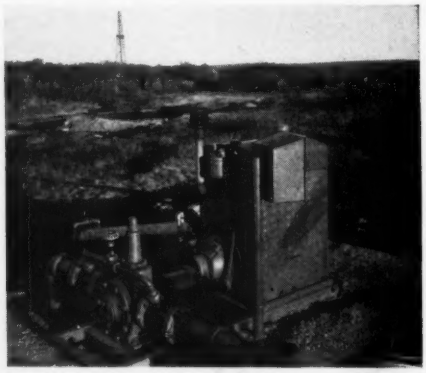
• BASIS OF SUCCESS •

TRANSIT ROTARY Pumps owe their unique success in many fields of service to Simplicity in Design, resulting in fewer wearing parts, easily renewed.

Bulletin 705 will be furnished gladly on request.







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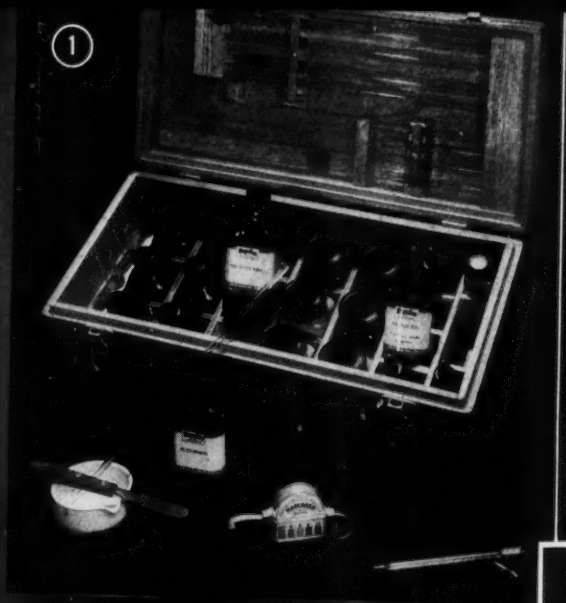

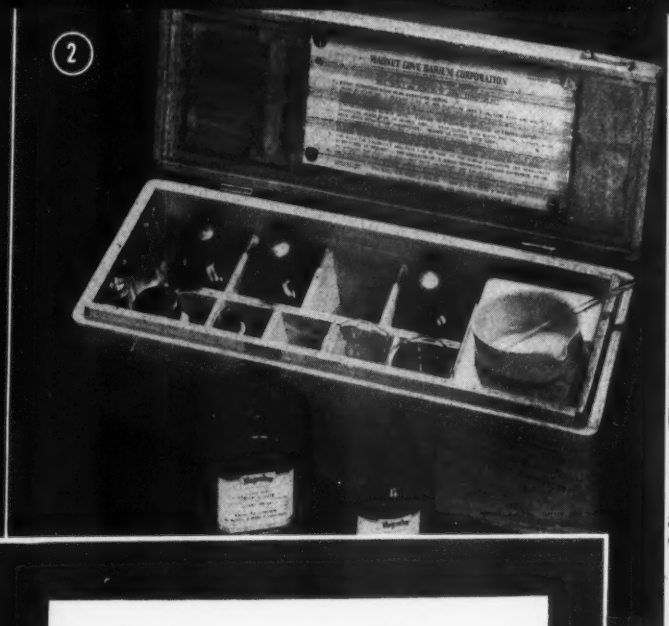

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Complete
DRILLING MUD SERVICE

...INCLUDES FIELD AND LABORATORY
MUD TESTING EQUIPMENT

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2. **SALT ... ALKALINITY KIT** ... for determination ... and chloride content of drilling ...
3. **FANN ... METER** ... rugged 6-volt motor ... viscosimeter for obtaining viscosity ... quickly and accurately.
4. **FANN ... PRESS** ... an accurate, portable, ... instrument for determining water ... characteristics of drilling mud.
5. **FANN ... METER** ... dual speed, 115 volt, ...

MAGNET COVE BARIUM CORPORATION, Malvern, Arkansas; Houston, Texas
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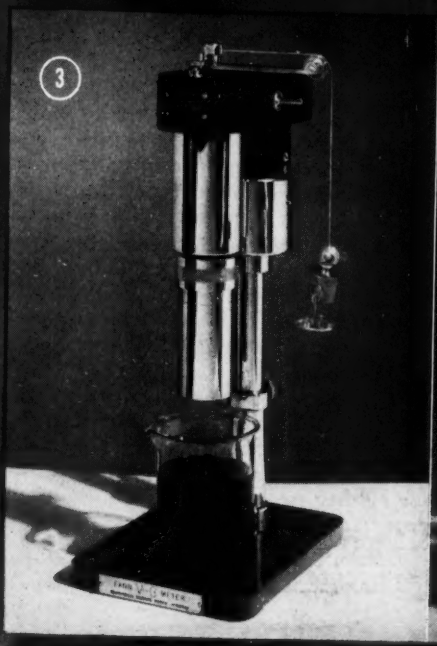

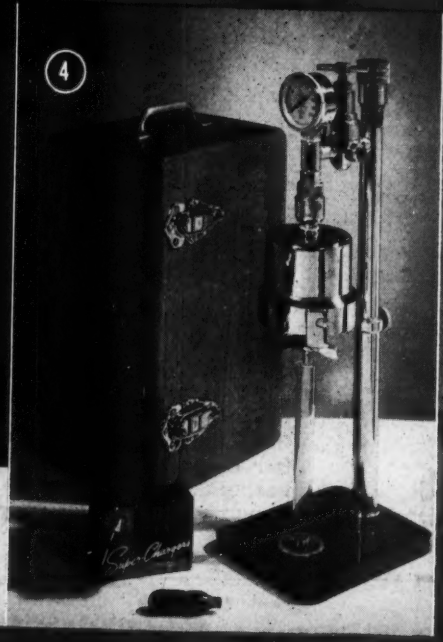

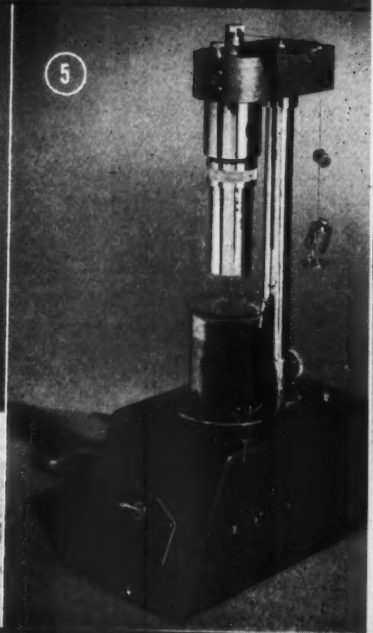

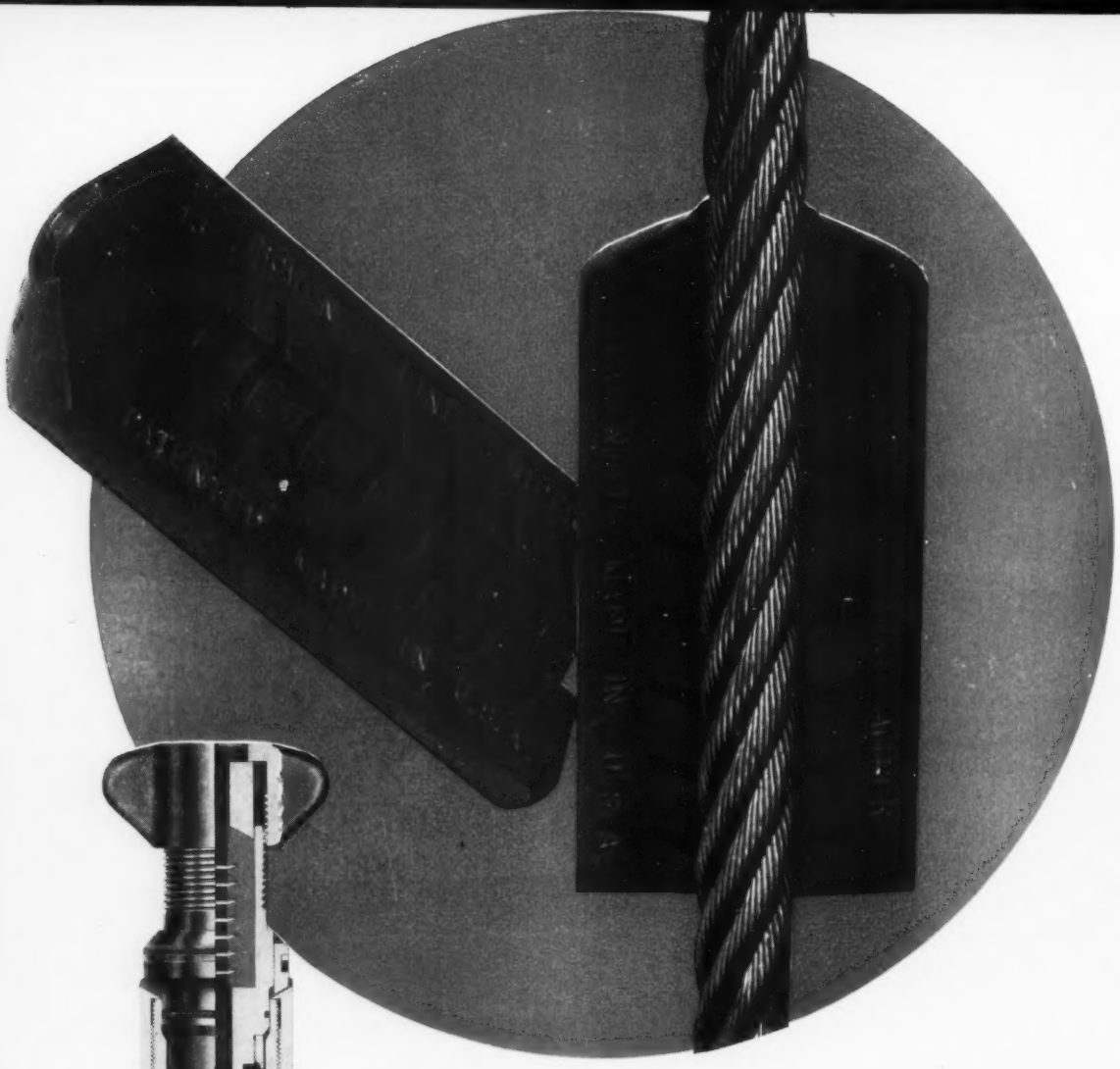

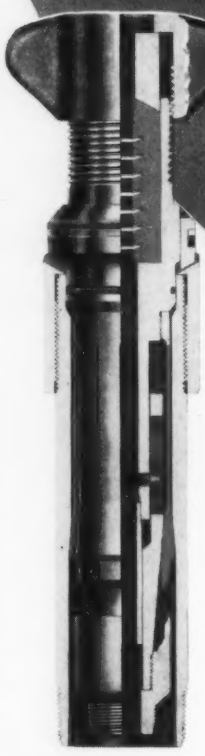

In the Bowen Automatic Line Wiper
MURRAY RUBBER HOLDS THE LINE
against hazardous fluid leaks

When running tools on a wire line, the Bowen Automatic Line Wiper is a handy piece of safety equipment to have on the rig. By preventing fluid from passing through the unit around the line, Murray-molded line rubbers contribute to the efficiency and safety of the Bowen Automatic Line Wiper.

The line rubbers are designed to give maximum life. The wiping sections are evenly spaced and shaped to allow the line to pass down through them with minimum resistance. When the line is pulled upward, this exclusive line rubber design causes the wiping sections to grip the line tighter than any other.

You are invited to bring *your* rubber molding problems to Murray. Oil industry experienced engineers combined with the facilities of the largest, most modern and complete rubber manufacturing plant in the South assure a prompt and economical solution to your rubber problems.

Murray Rubber

MURRAY RUBBER CO.
HOUSTON, TEXAS

NUMBER 2 OF A SERIES

Pacific's Proved Performance

helps make Record Runs

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Photo Courtesy M. W. Kellogg Co.

Fluid "Cats" A, B and C at the Cities Service Lake Charles Louisiana Refinery are served by Pacific Centrifugal Pumps. The record runs made by each unit prove Pacific Pumps "can take it" whether the service demands 10,296, 12,960 or 13,488 hours of continuous service pumping hot or cold oils, slurries, or water.

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DEPENDABLE –
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minimize reservoir oil SHRINKAGE through RESERVOIR FLUID ANALYSIS

As one barrel of reservoir oil is brought to the surface and its gas comes out of solution, that barrel of oil *shrinks to less* than a barrel of stock tank oil. This shrinkage, directly related to the amount of gas allowed to evolve from the oil, often runs as high as 60 percent. Thus, the benefits to be gained by correcting current field operating practices in order to hold this shrinkage of reservoir oil *to a minimum* are of definite economical significance.

An accurate laboratory measurement of the *flash* gas-oil ratio, made at various separator pressures, will reveal the amount of shrinkage occurring under specific field conditions. Then, with these data, an operator can determine the optimum separator pressure to obtain more oil at the surface per barrel of oil removed from the reservoir. (Gravity of the oil being produced can be raised through use of the same data.)

Core Lab's service of Reservoir Fluid Analysis is designed solely for the purpose of obtaining and analyzing bottom hole samples from key wells to determine whether or not you are operating your reservoir under optimum conditions.

Shrinkage and gravity are only two of the many physical properties which are developed from a measurement of Pressure-Volume-Temperature relationships of the oil and its dissolved gas through comprehensive Reservoir Fluid Analysis.

Think it over—and call the Core Lab representative nearest you.

CORE LABORATORIES, INC. • DALLAS, TEXAS

DALLAS HOUSTON CORPUS CHRISTI SHREVEPORT TYLER LAFAYETTE NATCHEZ
OKLAHOMA CITY DENVER MIDLAND ABILENE RANGELY WORLAND BAKERSFIELD

"If it's worth coring, it's worth analyzing."

CORE LAB

PETROLEUM RESERVOIR ENGINEERING

Get your equipment to location

on time--every time

regardless of weather and running conditions!

Haul with

WALTER

4-POINT POSITIVE DRIVE

TRACTOR TRUCKS

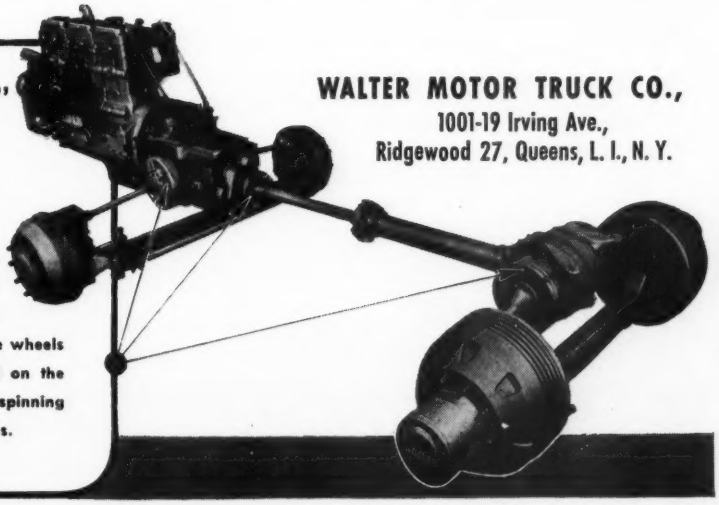
OILFIELD hauling is mostly off-the-highway hauling, which calls for special design in the trucks you use. Power and ruggedness are important—but they are helpless without unfailing TRACTION to keep loads moving in all kinds of terrain and weather.

Walter Tractor Trucks combine all three—power, traction and ruggedness—to a degree found in no other truck. Especially designed and built for severe off-highway hauling, Walter Tractor Trucks keep your heavy rigs, pipe and servicing equipment moving on schedule, regardless of hauling conditions.

The outstanding feature of Walter Tractor Trucks is the 4-Point Positive Drive which provides super-traction, as described below. They also incorporate many other exclusive engineering features especially developed for gruelling off-highway hauling. Write today for detailed literature giving the complete story.

How WALTER "Mechanical Brain" concentrates wheelpower where needed, when needed

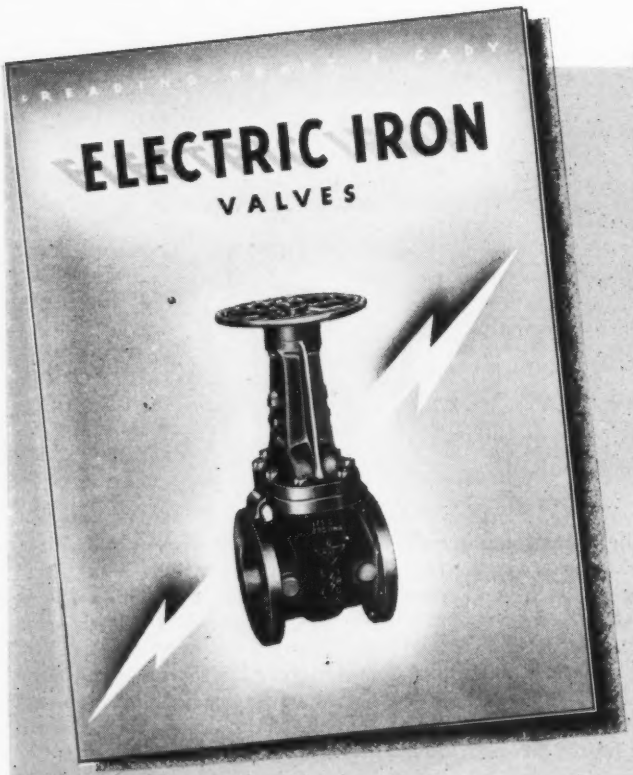
• In the Walter 4-Point Positive Drive System, three automatic locking differentials act like a "mechanical brain", proportioning power to each wheel according to its traction at any instant. If one, two, even three wheels lose traction, power is automatically concentrated on the working mates. No power is wasted on helpless, spinning wheels; no bogging down on soft or slippery surfaces.



WALTER MOTOR TRUCK CO.,
1001-19 Irving Ave.,
Ridgewood 27, Queens, L. I., N. Y.

BETTER IRON MAKES BETTER VALVES AT READING-PRATT & CADY

There is one *BEST* method of melting and refining iron for valve castings. It is R-P&C's *Electric Furnace method.*

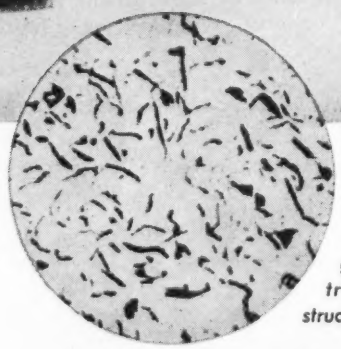


THIS FOLDER tells you why Electric Iron is better than iron made by the conventional cupola process. Interesting information if you buy or specify iron valves. Write for DH-18.

YOU PAY NO PREMIUM for the extra quality in R-P&C Electric Iron Valves. But you do get better valves — longer lasting, more dependable.

Electric Furnace Cast Iron is a low-sulphur, low-phosphorus iron of homogeneous, fine-grained structure. It is clean and of uniform quality.

Before buying or specifying iron valves, get the complete story of R-P&C Electric Furnace Iron. Write for our descriptive folder—DH-18.



UNIFORM STRUCTURE

Photomicrograph (enlarged 100 times) shows even distribution of fine graphite flakes. This contributes to the uniform structure of R-P&C Electric Iron.

ACCO

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READING-PRATT & CADY DIVISION
AMERICAN CHAIN & CABLE

READING PRATT & CADY VALVES

TRADE MARK

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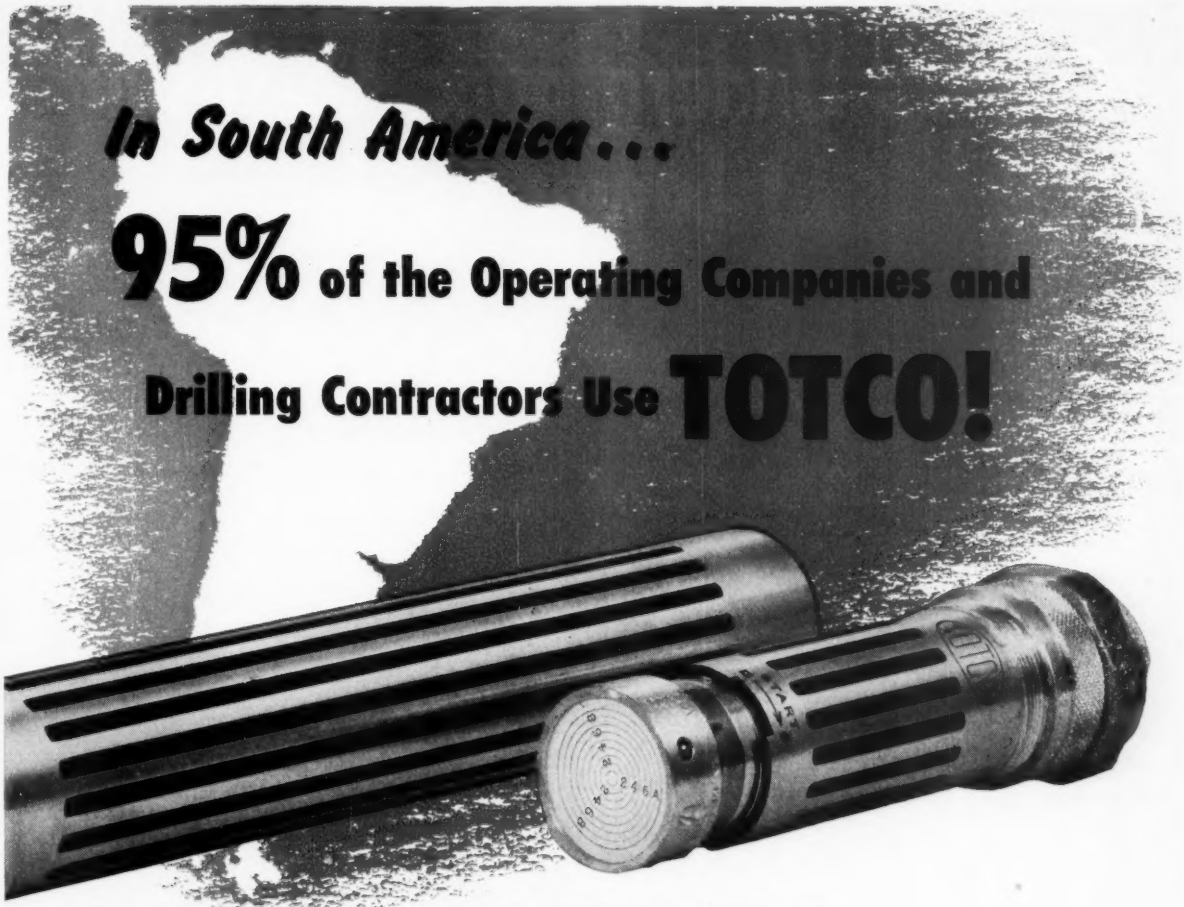

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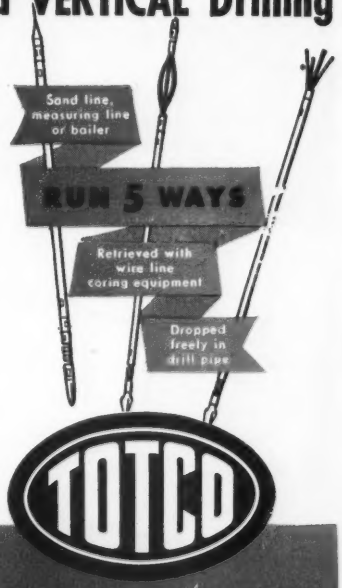
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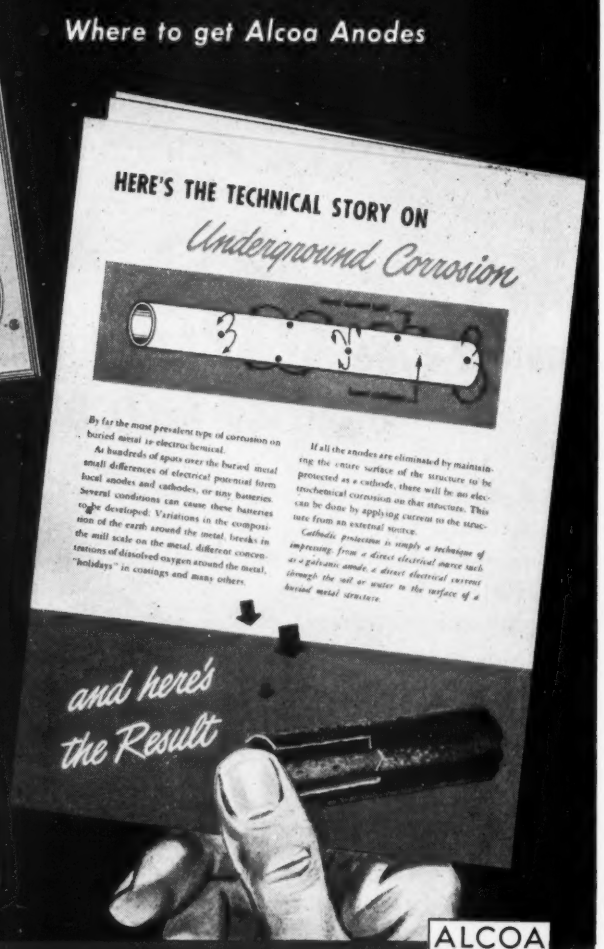
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Underground Corrosion
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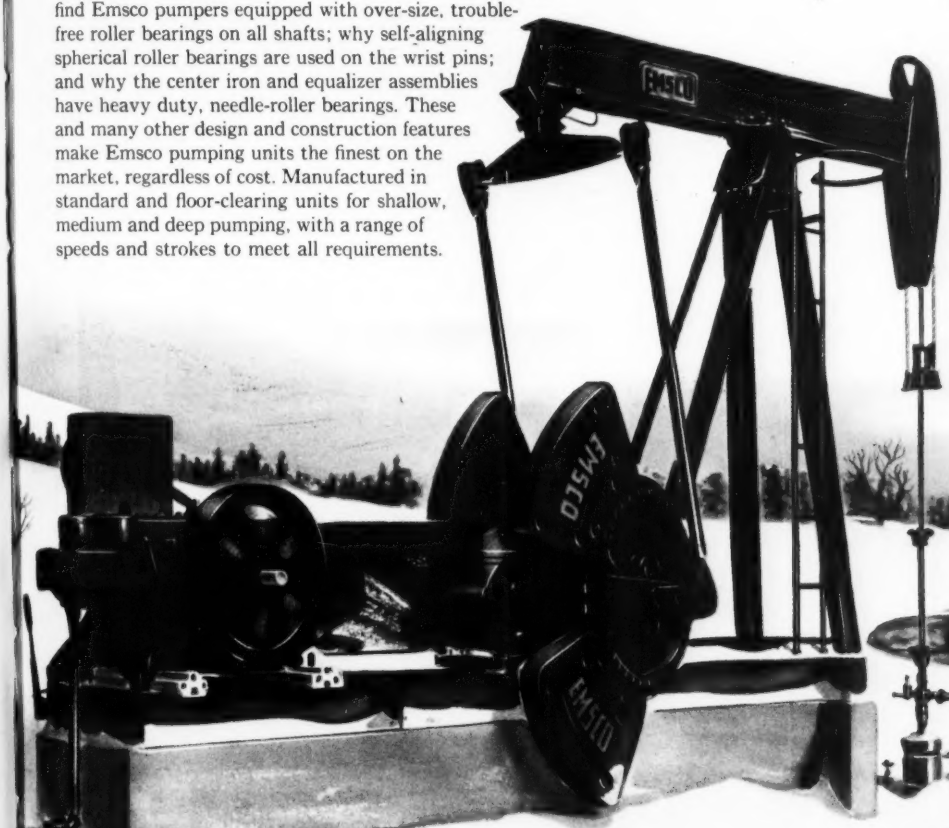

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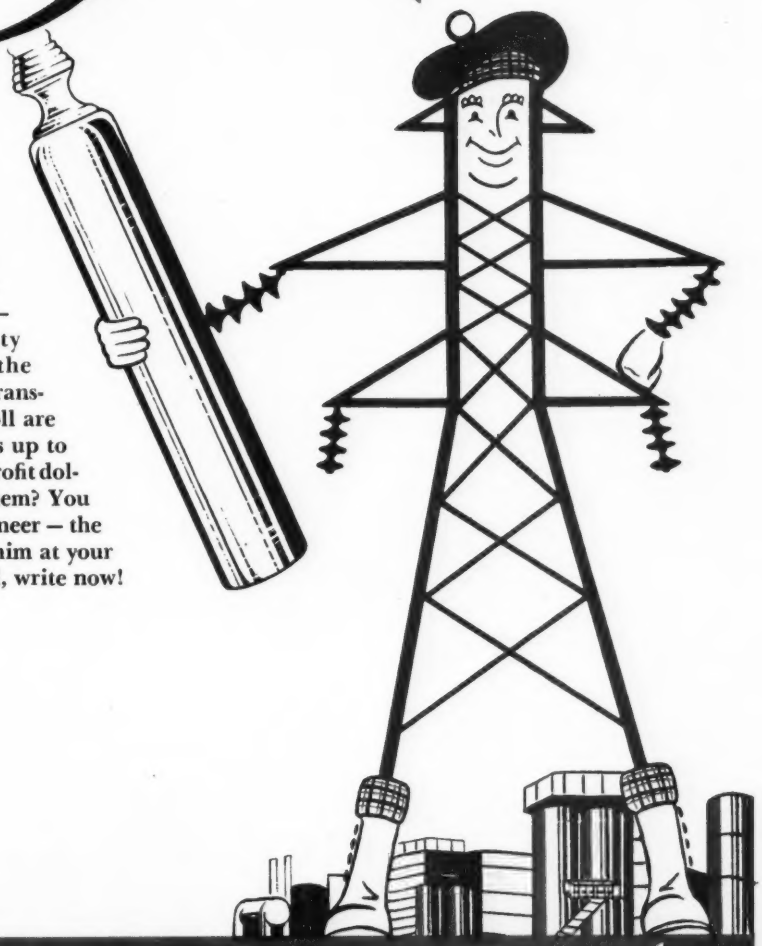

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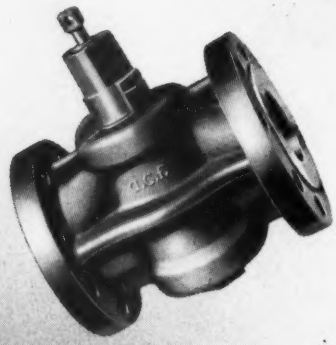

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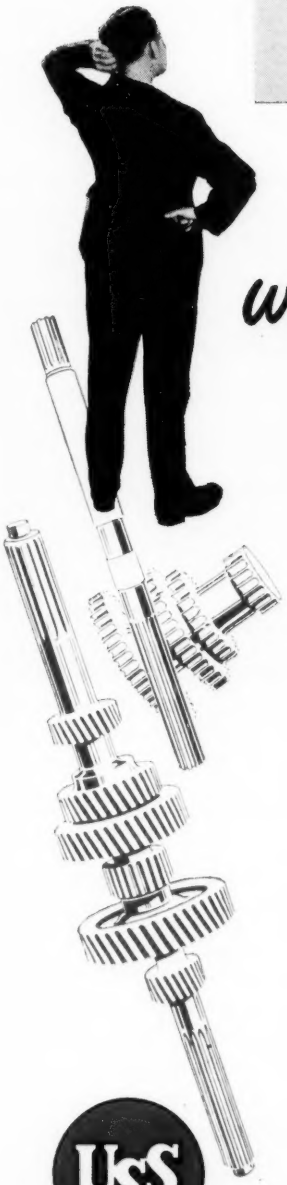

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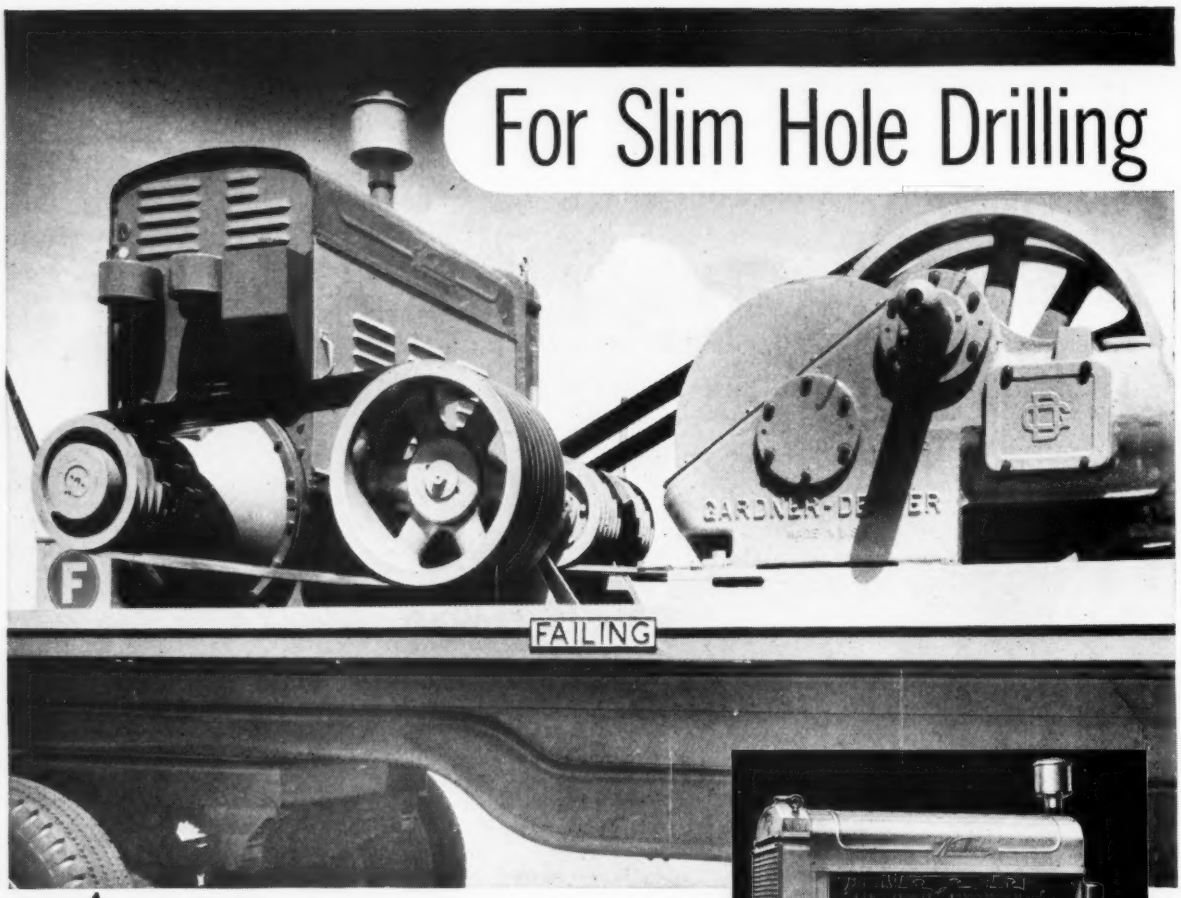
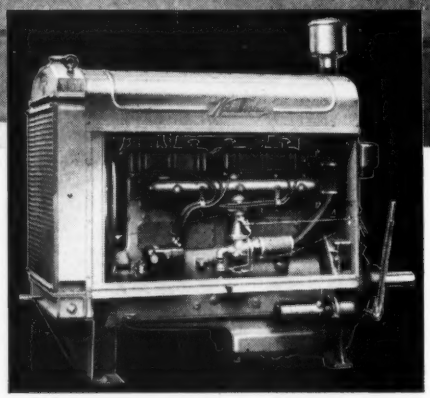


The WAUKESHA-POWERED "66" Portable Unitized Drilling Rig



MODEL 145-GKU OIL FIELD POWER UNIT—6 cylinder, 5¼-in. x 6-in., 779 cu. in. displ.; burns gas or gasoline.

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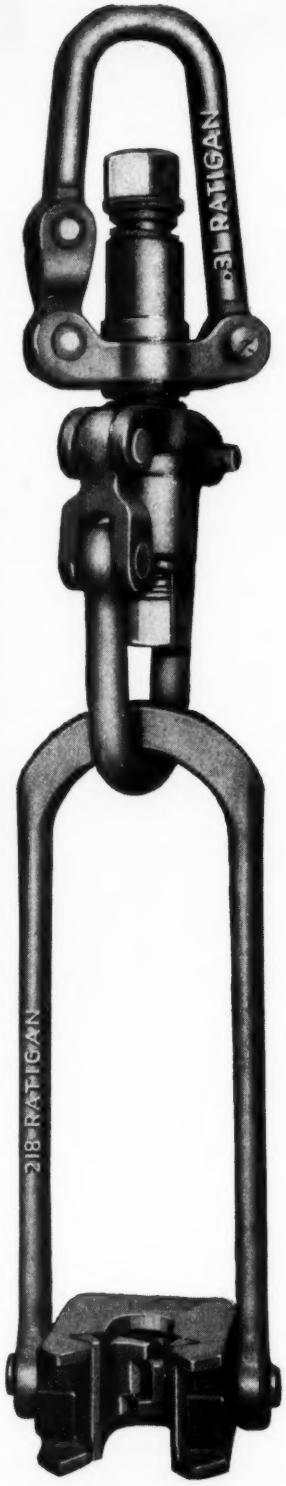

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CAPACITY, 100 TONS

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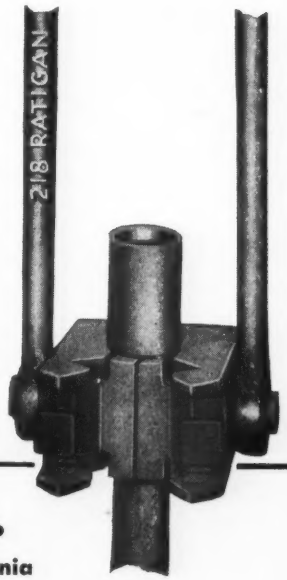
Open position showing details of the locking device. The elevator is held by the Ratigan No. 31 Spring-Type Swivel "C" Link.



Ratigan No. 218 Tubing Elevator in closed position with tubing firmly in position.

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D—GLAND
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F—COLLAR maintained in close sealing contact with top face of plug by packing N under compression
G—TOP FACE of PLUG
H—LUBE GROOVE
I—PLUG LAPPED to BODY in manufacture assures perfect leak-proof fit.
J—LUBE GROOVE
K—LUBRICANT CHAMBER. Under pressure from screw piston A, lubricant creates an hydrostatic layer between plug and body during lubrication tending to free plug for easy turning
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JOURNALLY Speaking

The Professor Is Modest

THIS department recently tried to draw a moral from the fact that the federal Government muffed its opportunity to exploit the "world's first commercial oil well" in Indian Territory in 1859, the dope being taken from an advance press notice of a book by Prof. Carl Coke Rister of University of Oklahoma. Comes now a letter from the professor, who says:

"Thanks for the plug you gave my forthcoming oil book in the Journal on February 3. I am not sure that we could call the Ross well the first commercial producer. States like Kentucky, Ohio, and others east of the Mississippi River also claim that honor. It is true that Ross' well produced about 10 bbl. of crude oil daily, that oil from it was sold for cattle dip and axle grease. But the well ceased to flow after about a year and was then neglected. Your article is quite true in that the Ross well did not have its publicity agent and that the federal Government completely overlooked its significance. No doubt the slavery and secession issues soon to provoke war distracted the attention of the officials.

"My book is scheduled for release on May 7. So far as I know it will be the first book in this field done by a historian and by extensive historical research. I have found petroleum a new field for historical research. Just why American historians have not entered this great important field I cannot say. I am saying in the introduction of my book: 'The role of oil in our economy and in the human cultures that have developed throughout the world under its benefits is simple and unassailable. The moving parts of all the machines of industry, commerce, and transportation are bathed in oil. The force which moves most of it is oil. Individual transportation rests largely upon oil—rationing during the late war made that fact entirely obvious. The future ramifications and byproducts are enormous in number and vast in their influence.'"

In spite of the historian's passion for accuracy, we still say this incident proves that the Government could have been in the oil business before Colonel Drake but lacked—and still lacks—the drive of competition and the profit motive which the oil business requires. Anyway, we're glad to give the professor's book a plug, and maybe we'll even read it when it comes out.

Red Oilski

SOVIET scientists seem to be engaged in a systematic campaign to show that Russians invented or discovered just about everything worth while long before the capitalistic reactionaries to whom the rest of the world gives credit.

So far we have noted claims that Russians were first to discover America and to invent the airplane, the dynamo, the electric light, the radio, and quite a few other things which the capitalistic world has in more abundance than the area behind the Iron Curtain.

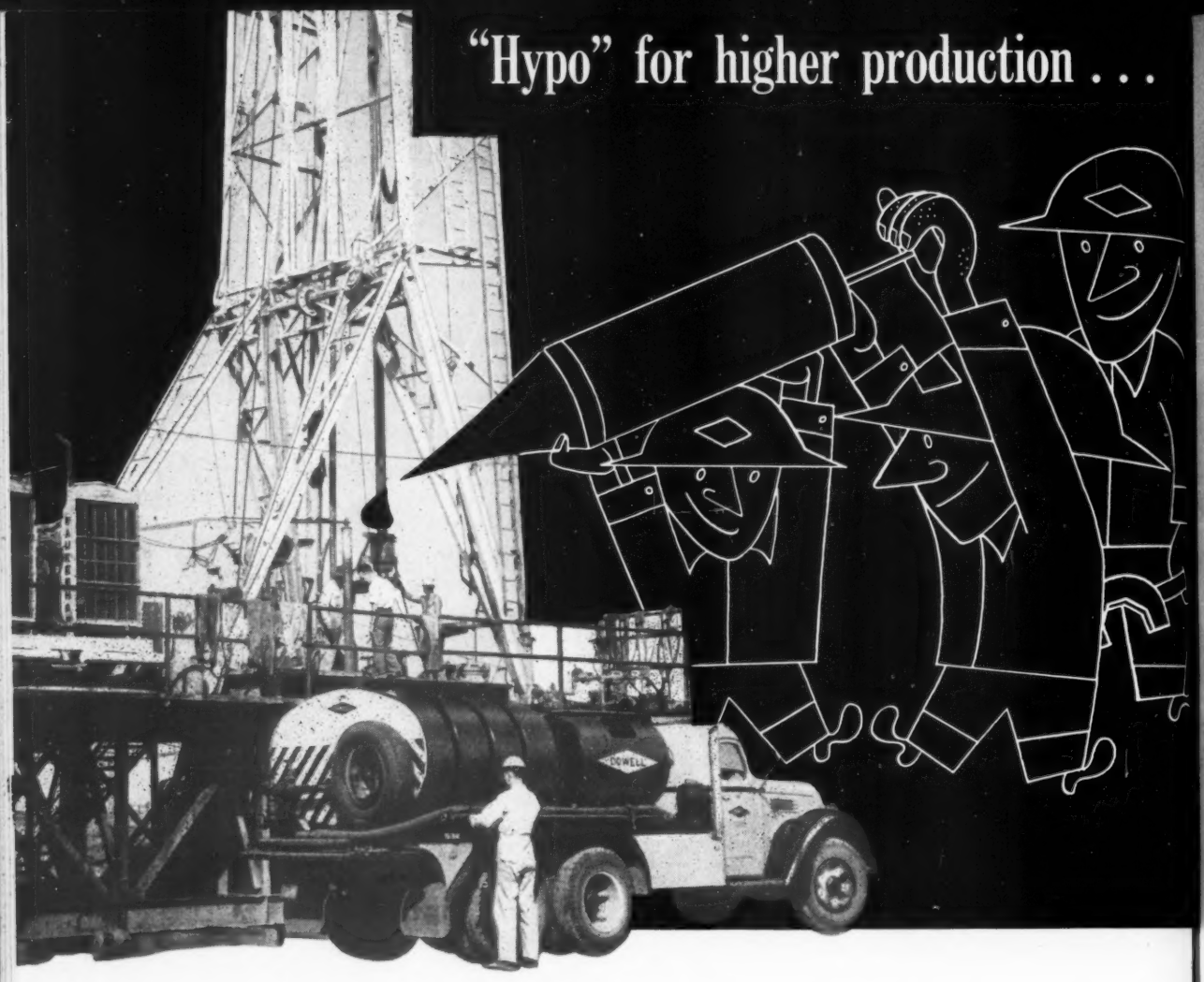
For some reason, however, the Russians haven't put forth any claims to having started the oil industry.

The historical fact is that the Zoroastrians or somebody made use of the natural oil seepages near the Caspian Sea quite some centuries before the Bolshevik revolution, and the oil was lying around on the ground in those parts all the time just waiting for somebody to develop it.

But the Russians had better not claim to have started the oil industry. It took capitalistic free enterprise to do that. There is a big difference between oil in the ground and an operating oil industry, as people in various parts of the world are discovering.

Sure, Russia was known to have oil long before anybody else, but the natives didn't know what to do with it. The same goes for their other claims to "firsts." Let the Reds get what satisfaction they can out of their claims to discovering things they didn't know how to develop. On this side of the globe we hold the quaint idea that it's more important to turn new discoveries into practical value to a lot of people, and all we claim is that our system beats the Red's all hollow at this.

"Hypo" for higher production . . .



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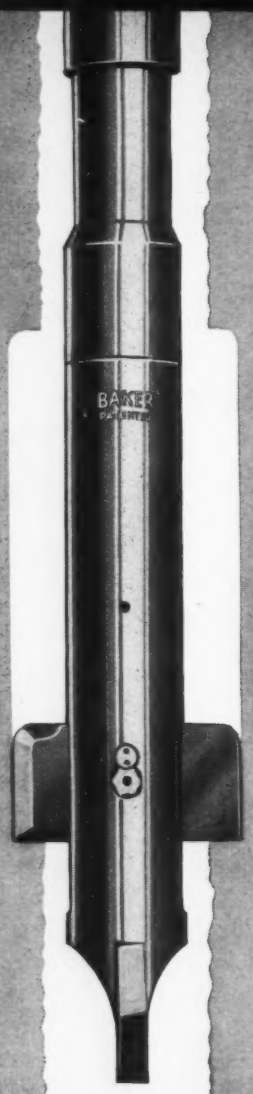


FOR SAFE, LOW-COST HOLE ENLARGEMENT

. . . no other tool is equal to the BAKER ROTARY WALL SCRAPER.– When it is desirable to enlarge the diameter of an open hole to an extent considerably greater than the diameter of the casing, you can depend upon this strong, safe Wall Scraper with blades which open positively when pump pressure is applied. The uncased hole *can be enlarged at any point,* and by changing to progressively larger sizes of blades, an amazingly increased diameter can be secured. Example: No. 6 size Scraper can be run safely through 9⅝" API casing, then will ream from a minimum of 9¼ inches to maximum of 19 inches by changing to increasingly larger sizes of blades.

RUGGED BLADES CLOSE SAFELY

Baker Wall Scraper blades have extra-long vertical cutting edges which prevent any tendency to "corkscrew" and insure scraping the maximum footage of full-gauge hole. And, when the Scraper is to be removed from the hole, pumps are shut down and a strong spring aids in closing blades into body. These blades are made from alloy steel forgings, and their cutting surfaces are hardfaced and set with tungsten carbide inserts to insure long cutting life.

MANY IMPORTANT USES

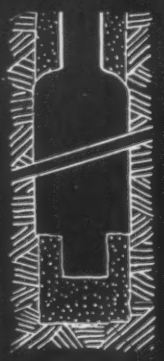
THE BAKER ROTARY WALL SCRAPER is extremely versatile and is successfully and economically used for many worthwhile applications, a few of which are shown below. It will pay you to learn all about the Baker Rotary Wall Scraper (Product No. 500-D) from your BAKER (or Composite) CATALOG, or better yet, ask the Baker representative in your area for helpful suggestions as to how this efficient tool will fit right into your drilling program.

BAKER

ROTARY HYDRAULIC EXPANSION

WALL SCRAPER

PRODUCT NO. 500-D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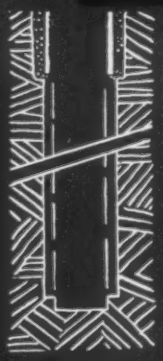
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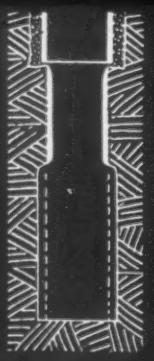
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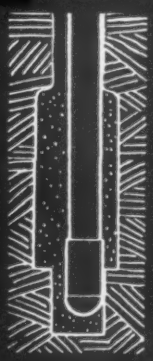
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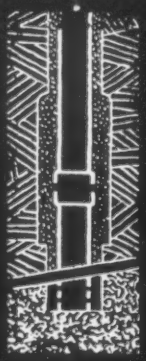


Fig. 5

Fig. 6

These typical uses illustrate a few of the many worthwhile applications of the Baker Rotary Wall Scraper.

Figure 1—WATER SHUT-OFF TESTS are made after rat-holing below the shoe, "wall scraping" for a vertical distance of 5 feet or more to the gauge of the original hole (or slightly beyond). Figure 2—ENLARGING HOLE TO SET CASING OR LINER with maximum ease and safety. Figure 3—REMOVING MUD SHEATH from the face of the formation to permit cement to bond with original formation. This same procedure is used to scrape the face of the oil sand to increase production. Figure 4—BOTTLENECKING to insure complete encasement of the shoe joint with cement; also to minimize hazard of channeling at this vital point. Figure 5—ENLARGING HOLE FOR C.P. JOB—showing "bottlenecked" section with casing or liner serving as water string above, and oil string below, the cementing point. Figure 6—GRAVEL PACKING is easily and effectively performed when the hole has been enlarged with a Baker Rotary Wall Scraper.

BAKER

OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

XUM

THE OIL AND GAS JOURNAL

Aftermath of Shortage

FOR the past 6 or 7 years the oil industry has been bucking a shortage, working desperately to bring its production up to a constantly enlarging demand for petroleum products.

Now the shortage is over but the industry seems to be thunderstruck by the realization. What happened? Nothing at all except that there is now enough oil to take care of requirements, and producers, distributors, and consumers can stop straining and catch their breath.

The bottom didn't drop out. The prospect is for a growing demand, which means plenty of work for everybody and many opportunities for the foresighted and the aggressive.

Why should such a prospect throw consternation into many segments of the industry? The prospect is a bit different from what the industry has faced for several years, but it is similar to conditions which prevailed during most of the history of the oil industry.

For a decade or more before the war and many times before that there was chronic overproduction of oil and intense competition for markets. Yet the industry thrived and grew to be one of the world's greatest. No responsible forecaster predicts a depression for the oil industry nor a real surplus of crude. Just a little more oil than the market will take avidly.

There is nothing unhealthy or alarming about such a situation. It is the condition under which the competitive system works best and consumers and wide-awake operators fare best.

Some adjustments are required to meet the new situation, but the adjustments are largely psychological. The same adjustments are being experienced by many other industries which have, to their great surprise, suddenly emerged into a buyers' market. First there is alarm, then bewilderment, and then a realization that this is the way things were before the war and we had better dust off our memories and see what happened then.

In oil as in every business some individuals may not make the adjustment to competitive conditions fast enough to survive. Accustomed to having buyers beat a path to their door, they may let underbrush grow up around them until they are engulfed.

But the enterprising operator should welcome the return of a little surplus and a little competition. Now there is a little room to turn around, a chance to try new things, an opportunity to test himself against the field.

Profits may decline, but this means finding new ways of cutting costs. Prices may soften, but this means scratching for new markets. Competition will increase, but that means a challenge to ingenuity and energy.

The years of shortage brought no good to anyone in the oil industry except the coat-tail riders. Now that we're back to the good old days of competition there is every reason why the oil industry, above all other industries, should refuse to take a dim view of the prospect.

Restoration of Old Excise Taxes On Imported Oil Asked by I.P.A.A.

by Bertram F. Linz

WASHINGTON. — Independent oil men and state officials joined February 21 in urging the Senate finance committee to write safeguards for the domestic petroleum industry into legislation extending the Trade Agreements Act.

They asked, specifically, that the original rates of excise tax on imported crude and products be restored and recommended a provision setting quotas on imports which would limit annual entries for consumption, from all countries, to an amount not exceeding total exports of crude and products from the United States during the preceding year, with a proviso that the quotas could be suspended during any period when domestic supplies were inadequate to meet current national oil requirements.

Last week the Independent Petroleum Association of America asked the Tariff Commission to find that the reciprocal trade agreements have resulted in grave injury to the domestic industry and recommended to the President the withdrawal of all concessions on oil made in those agreements and restoration of the import excise taxes at the rates originally provided by Congress.

Plans for the presentation of testimony this week were developed at a Sunday meeting of members of the I.P.A.A., who went to the Capitol accompanied by conservation officials of four states to urge that, in the interest of national security, some provision be made in the tariff legislation to halt the steady upward trend of imports which, they said, already has necessitated cutbacks of some 500,000 bbl. in allowables in Texas, Oklahoma and Kansas.

Brown Directs Presentation

The presentation was directed by Russell B. Brown, general counsel of the I.P.A.A., who briefly went over the arguments presented previously before the House ways and means committee by L. Dan Jones, attorney for the association.

Wirt Franklin, Ardmore, Okla., independent operator, made the main argument, devoting himself chiefly to the national defense phase of the situation and the possibilities that, if dependence on foreign oil continues to increase, the domestic industry, which was able to oil two major wars, would not be able to provide sufficient oil should another occur.

Franklin pointed out that the Middle East fields from which most of the current imports are coming would inevitably be overrun within 30 days should there be war with Russia, and it would then be necessary for our air force to bomb out of existence facilities on which American companies have expended millions of dollars.

Given the necessary steel, protection against imports, and the other elements of a "favorable climate," Franklin said, the domestic industry will again be able to develop and have ready for instant use the excess productive capacity which would be immediately necessary in the event of war.

Franklin read into the record a letter written by Interior Secretary J. A. Krug February 17 to Sen. Tom Connally of Texas, a member of the committee, in which it was admitted that "oil imports are one of the things that had had an effect on the output of oil in Texas."

Krug Gives Opinion

Krug expressed the opinion that the import situation will be corrected by the "normal process of competitive private enterprise," and pointed out that the United States has for many years imported oil even when productive capacity here was far above actual production.

"Moreover," he said, "there is, of course, no statutory authority for the federal Government to limit oil imports. While it is of the highest importance that imports of foreign oil not be permitted to undermine the domestic petroleum industry, the policy question involved in their limitation can only be resolved by Congress. In so doing, Congress will, presumably, wish to give consideration to the many important factors involved, such as the reciprocal trade agreements, a program and our relations with foreign nations, the relation of the problem to the national defense, the effect, if any, of such limitations upon the ready availability of petroleum to the American public at reasonable prices, and other similar complex considerations."

Franklin told the committee that if imports are allowed to increase so as to shut back our production in this country and destroy the market demand for oil products, "development will stop and in a few years we will be dependent on foreign oil."

"If you take away the market, where are we going to get the money to produce new supplies?" he asked, adding that imports carry no benefits to the consumer in the way of lower gasoline prices.

Franklin also suggested that reimposition of the original excise tax rates might be a partial answer to President Truman's demand for more tax revenues, a matter which is pending before the same committee.

Among the group testifying on the industry's position were B. A. Hardey of Shreveport; C. H. Murphy, Jr.; Warwick Downing; and J. P. Coleman of the North Texas Oil and Gas Association. State representatives included Col. Ernest O. Thompson of the Texas Railroad Commission; Walker T. Pound, Oklahoma state conservation officer; Jeff A. Robertson, Kansas Corporation Commission, and Rush M. Blodget, Oil Producers Agency of California.

Ten Texas Oil Firms Sued For Alleged Price Fixing

HOUSTON.—Ten major oil companies were named in an antitrust suit filed this week in Austin, charging them with fixing and maintaining uniform tank-wagon prices on gasoline in Texas.

Filed by Atty. Gen. Price Daniel in the Ninety-eighth District Court, the suit alleges that the defendants have "combined their capital, skill, and acts" to increase, fix, and maintain uniform prices on gasoline delivered for sale to Texas filling stations since July of 1946.

Defendants in the state's suit are Arkansas Fuel Oil Co., Cities Service Oil Co., Continental Oil Co., Gulf Oil Corp., Humble Oil & Refining Co., Magnolia Petroleum Co., Standard Oil Co. of Texas, The Texas Co., Sinclair Refining Co., and Phillips Petroleum Co.

L. T. Barrow, chairman of the board, Humble Oil & Refining Co., said: "Not having seen the state's petition in the antitrust suit filed in Austin today by the Attorney General, we are not in position to comment on the suit other than to say that we know of no violation of the antitrust laws by the Humble company and can conceive of no basis for making it a defendant in the suit."

The suit alleges that eight of the defendants combined their efforts, after the Phillips crude-price increase on September 28, 1948, to keep the price of crude oil down for the purpose of "maintaining the abnormally large profits existing as a result of the wide spread between the crude-oil prices and the selling prices of refined gasoline."

Price Drops Make Heavy Fuel Oil Cheaper Than Coal on East Coast

by Dahl M. Duff

THE recent series of drastic price reductions of No. 6 residual fuel oil has brought the cost of this product in New York Harbor below that of coal for the first time since the end of the war.

Last week latest cut in the price of No. 6 fuel oil, 10 cents by Esso Standard Oil Co., lowered the New York Harbor tank-car posting to $2.05 a barrel. The price of the amount of coal sufficient to give equivalent heating value remains at $2.24—a differential of 19 cents in favor of oil.

These price trends are shown graphically in the accompanying table. The graphs provide a study in both cause and effect and emphasize an economic development of major significance to the petroleum industry. The data plotted are for New York Harbor, the major East Coast consumption point.

In Direct Competition

Heavy fuel oil, used mainly in industry, competes directly with coal in the East. It is the only petroleum product with a major nonindustry competitor. For many years prior to the postwar period, the refining industry obtained its primary realization from gasoline and lubricating oils and treated residual as a byproduct to sell for less than the cost of the crude itself.

Immediately after the war, when the industry was still in the frozen-price period, No. 6 sold for $1.51 a barrel in New York Harbor. The price of 0.229 tons of bituminous coal, calculated to equal 1 bbl. of No. 6 in B.t.u. value was $1.46.

The differential at this time was 5 cents in favor of coal. The price figures do not, of course, take into account a number of less tangible factors in the coal-fuel oil relationship, such as relative efficiency, convenience, and continuity of supply. These factors on the side of oil are normally adjusted out in the play of the market and apparently are sufficient to overcome the attraction of a somewhat lower coal price.

Crude-price increases and the enormous demand for all petroleum products beginning early in 1946 started a succession of jumps in the price of No. 6. Coal prices also increased but not at the same rate. The price of No. 6 in New York Harbor reached a level of $3.03 in January 1948 and remained on this plateau for about 10 months.

The coal-oil differential steadily widened as a result. It was at its maximum of $1.06 the first 3 months of 1948. Coal price increases narrowed this to 81 cents by October, but the premium for the use of oil was still more than 16 times above that at the close of the war.

Price Boost Cuts Demand

Through the first three-quarters of 1947, when the differential ranged from 25 to 50 cents a barrel, the position of residual fuel oil appeared to be little affected. It was in November 1947 when the oil premium jumped from 31 to 62 cents a barrel, that a demonstration of the influence of price on demand occurred. In October 1947 residual-fuel-oil demand ran 19 per cent ahead of the previous year. In November this percentage increase fell to 5 per cent. A part of this was due to the demand increase which followed a resumption of shipping after a strike in November 1946.

The demand-price relationship is indicated in the figures in the accompanying table.

There is naturally a considerable time lag between an increased coal-oil differential and the effect on demand. Both users with dual equipment and new installations to some extent are influenced. After April 1948, the slackening demand for residual fuel oil became even more pronounced.

The result came last November. Heavy production of all petroleum products led to an increasing surplus of residual fuel oil, and the price started tumbling. The fifth price cut in the last 3 months has carried the No. 6 price nearly to the level of February 1947.

It is too early yet to see the influence of the new price of No. 6 on demand, but the trend should surely move upward. There has long been sentiment in the petroleum industry for a more realistic pricing for residual fuel oil than on a byproduct basis, and a more equitable return from all the components of a barrel of crude oil. At the same time, postwar experience shows there is a definite limit for heavy fuel oil, governed to a large part by its competitor, coal.

In the accompanying chart, the coal price used is that reported by the U. S. Bureau of Labor Statistics. The No. 6 price is the tank-car posting of Esso Standard Oil Co. which, as a major supplier, is representative of the entire market.

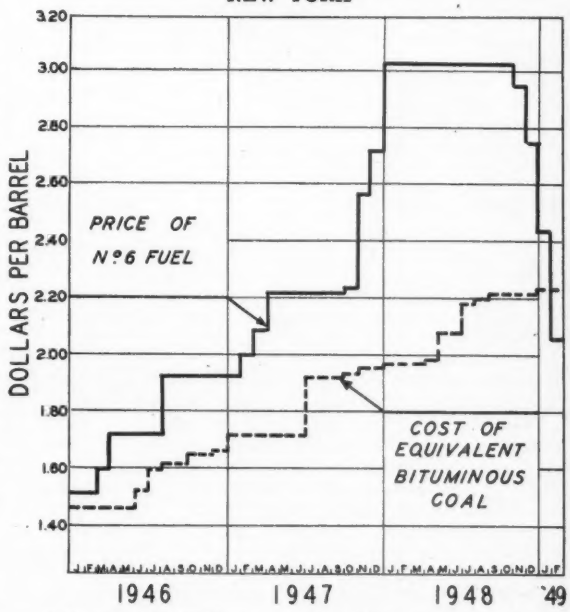
FUEL-OIL DEMAND-PRICE RELATIONSHIP

Month—	Differential	Residual domestic demand, % change from previous year
October 1947	$0.31	18.9
November 1947	0.62	4.9
December 1947	0.77	9.7
January 1948	1.06	0.2
February 1948	1.06	0.8
March 1948	1.06	4.2
April 1948	1.05	2.0

Supertanker for Canada

TORONTO.—Canada's first super tanker, and the largest oil carrier to operate under Canadian registry, is expected to join the Imperial Oil Shipping Co. fleet in May. The craft, to cost around $5,250,000, will carry 288,000 bbl. of oil.

PRICE OF NO. 6 FUEL VS. PRICE OF EQUIVALENT* QUANTITY OF BITUMINOUS COAL F.O.B. NEW YORK



*0.229 ton of bituminous coal has a B.t.u. content equivalent to 1 bbl. of No. 6 fuel.

Texas Court Orders Shutdown of Heyser Field by Vote of 7 to 2

by Leigh S. McCaslin, Jr.

HOUSTON. — The Texas Railroad Commission last week won a major round in its bout with oil operators over the question of shutting down fields which are flaring gas.

The state supreme court upheld, by a vote of 7 to 2, a commission order to shut down wells in the Heyser field of Victoria and Calhoun counties. In so doing, the court dissolved an injunction previously granted in Ninety-eighth district court in Austin restraining the regulatory body from enforcing its shutdown order.

After the announcement of the court's decision, Attorney General Price Daniel told the press that he will ask Austin district courts for trial "at the earliest possible moment" of 14 similar suits pertaining to other fields. Temporary injunctions have been issued preventing enforcement of the 14 shutdown orders. Operators in 26 additional fields presented testimony on January 25 to show why shutdown orders should not be issued against them. No further action has been taken by the commission since the "show cause" hearing.

No Blanket Decision

In making its decision, the state's highest judicial body made it clear that each field presents a special problem. Hence, the Heyser decision does not necessarily mean success for the commission for its 14 other shutdown orders. The court said, "This court has held that each oil field presents a separate problem. This court is here passing only on the order relating to the Heyser field, and the decision in this case does not prejudge the issues that may be involved in other fields."

Nonetheless, William J. Murray, Jr., chairman of the Railroad Commission, commented that "Although the court clearly states that each oil field presents a special problem, the similarity between this case and others pending gives rise to the belief that this decision will be of far-reaching significance." He added, that "It is believed that the result of this decision will be to further stimulate and expedite an immense conservation program to utilize flare gas which has been in progress since the close of the war."

Commission member Olin Culberson was similarly enthusiastic and characterized the decision as "the most important step forward in the regulation of the oil and gas industry in the interests of the public that has ever been taken." Culberson added that he was pleased "not because of any added authority or power it may bring the commission, but because of the recognition of the fact that if we are to have conservation of natural resources it should truly apply to all forms of waste."

Operators in the Heyser field have 15 days following the decision to file a motion for rehearing. Presumably if they do not do so, the lower court injunction will stand dissolved and the shutdown order become effective. The original railroad commission order was issued November 22 and called for a shutdown effective December 1 if gas flaring was not stopped. Operators in the field expect to have their residue gas tied into the Tennessee Gas Transmission Co. system by April 1. If they do, the shutdown will remain in effect for less than a month.

The majority opinion of the state supreme court in the Heyser case was prepared by Associate Justice John H. Sharp. Sharp argued that "the principal question for determination here is whether the flare-gas order of the Railroad Commission was fair and reasonably supported by substantial evidence. We also must decide whether the trial court erred in striking down the order for the Heyser field and in granting a permanent injunction restraining the enforcement of the order."

Sharp's majority opinion defended the commission with "It clearly appears from this record that the commission is trying to carry out the mandate of the legislature and prevent the waste of a very valuable and important natural resources, and in doing so that it will not wilfully act in a tyrannical or arbitrary manner."

The two dissenting justices argued that the court had no jurisdiction over the case. Associate Justice G. B. Smedley wrote: "This court is without jurisdiction and the appeal should be dismissed. I express no opinion as to the merits of the question sought to be appealed, not having read the statement of facts, which should not have been filed."

Associate Judge W. St. John Garwood went further and said "that under the peculiar circumstances of this case, the order of the Railroad Commission is unreasonable." He defended the oil operators by stating, "The shutdown of any good business entails a loss, and this is certainly no less true of an oil field—indeed it is hard to imagine how any operator in his right mind would choose to burn a valuable product if in truth it is valuable rather than merely potentially valuable as of some future date."

Texas Independents Ask Duty on Oil Imports

HOUSTON. — "A sufficiently large import duty" against Middle East oil "as would equalize the huge cost of labor differences and help pay for protecting these foreign oil properties" was asked by a group of Texas independent operators last week.

Meeting in Houston at the call of H. P. Nichols, executive vice president of the East Texas Oil Association, the Texans signed a resolution petitioning Congress on the subject of imports. Glenn McCarthy, Houston oil man, was among the most outspoken at the meeting. The crux of the problem, according to McCarthy, was how to impress Congress with the importance of the situation. He told the assembly that his solution was for independents to deluge their senators and congressmen with letters.

One independent at the meeting made the point that exploratory drilling in the United States is the thing that keeps us prepared for a war—not the cutting of domestic production and increase in imports. He maintained that a healthy domestic industry with the incentive to wildcat is the solution to future reserves. Such thinking must be put across to the American public, he concluded.

In the group's resolution to Congress, several objections to the importation of Middle East oil were raised. Among these were: (1) "in order to protect said large quantity of oil . . . we may be forced into a large expenditure of our young manhood;" (2) Middle East producers "pay a very large income tax, or a gross production tax;" (3) "a very insufficient tax is paid upon such oil moved into the United States, resulting in an extremely unequal competitive advantage in the hands of the few large owners" of Middle East oil; (4) "the extremely large production of individual wells, gives the few owners of said oil a competitive advantage over our domestic oil properties."

Jester Heads Committee

HOUSTON. — Beauford H. Jester, governor of Texas, has been named chairman of the tidelands committee of the Southern Governors' Conference. Other committee members are James E. Folsom, governor of Alabama; Herman E. Talmadge, Georgia; Roy J. Turner, Oklahoma; and Earl K. Long, Louisiana.

——this week

IMPORTS—Import problem brings I.P.A.A. representatives and state conservation officials to nation's capital seeking legislation curtailing imports. . . . I.P.A.A. seeks restoration of the import excise taxes at original rates. . . . Selling Middle East oil in the U. S. at prices lower than in European countries violates the Anti-Dumping Act, attorney charges. . . . ¶Department of Commerce reports that imports of crude petroleum reached a new high level for December. . . . ¶Texas independent producers petition Congress to increase import duty. . . .

COURTS—Texas Supreme Court upholds a Railroad Commission order to shut down wells in Heyser field. . . . Court's decision "does not prejudge the issues involved in other fields." . . . ¶Moffett receives $1,150,000 judgment against Aramco in federal court decision. . . .

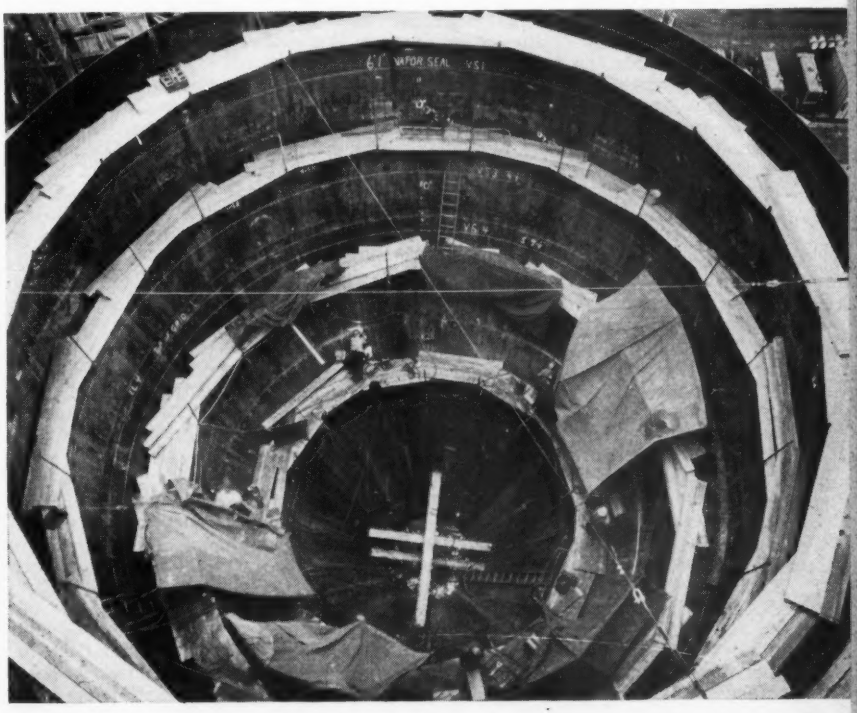
TRENDS—Daily average crude production in U. S. for week ended February 19 was 5,349,100 bbl., an increase of 12,450 bbl. over previous week but a decrease of 10,000 bbl. from same week last year. . . . ¶A total of 4,693 wells were completed in the first 7 weeks of 1949 compared with 4,490 in the same weeks of 1948. . . . ¶Total crude-oil stocks on February 12 reached 256,899,000 bbl., a gain of 31,900,000 bbl. over same period last year. . . . Major increases by origin were: foreign, 5,236,000 bbl. . . . Illinois-Indiana, 3,985,000 bbl. . . . Oklahoma-Kansas, 3,343,000 bbl. . . . Rocky Mountain, 3,708,000 bbl. . . . California, 3,366,000 bbl. (All of increase in heavy crude.) . . . Texas, 9,744,000 bbl. . . . Principal gain in Texas was for West Texas crude, up 8,376,000 bbl. . . . Stocks of East Texas crude were 1,100,000 bbl. less than last year. . . . ¶Localized price drops were noted in products market during week, but general tone was firmer. . . . Some observers predicted bottom had been reached, except for seasonal changes. . . .

INTERNATIONAL—Crude-oil production in countries outside the United States showed a tapering off in December. . . . Production cutback created in some areas due to indications supply has caught up with demand. . . . ¶Standard Oil Co. (N. J.) acquires half interest in refineries at Bari and Leghorn, Italy, with combined daily capacity of 16,000 bbl. . . . Jersey Standard plans modernization of the plants to increase production. . . . ¶Trans-Arabian Pipe Line Co. signs right-of-way agreement with Syrian Government. . . .

PIPE LINES—Projects involving 4,000 miles of big-inch pipe lines are under discussion by several companies. . . . Construction is slated to start soon. . . . ¶Columbia Gas System, Inc., spent more than $51,500,000 for construction of facilities during 1948. . . . ¶Buckeye Pipe Line Co. lets contract for 82-mile, 22-in. Lima-Toledo, Ohio, crude-oil line. . . . ¶Welding, laying operations completed on 150 miles of 20-in. natural-gas line from Poza Rica field to Mexico City. . . . ¶Northern Natural Gas Co. planning to lay 223 miles of pipe line during 1949. . . .

NATURAL GASOLINE—Magnolia Petroleum Co. lets contract for construction of natural-gasoline plant in Stephens County, Oklahoma. . . . Plant will have a capacity of 22,000,000 cu. ft. of gas daily. . . .

REFINING—Experimental project by U. S. Bureau of Mines and Alabama Power Co. may answer many questions on gasification. . . . ¶Production of phosphoric acid now under way at new Gulf Chemical Co. plant. . . . ¶Gasoline storage supplies reach new all-time peak, American Petroleum Institute reports. . . . ¶Rochester, N. Y., asphalt plant sold to London firm. . . .



Looking down into the cone of the huge regenerator of the new catalytic unit being built at the Bayway refinery of Esso Standard Oil Co. where the company is carrying out a large expansion and modernization program. The 49,000-bbl. unit, to go on stream in midsummer, is the largest fluid catalytic cracking installation yet built. Note the size of the welders on the lower walkway

Bill Submitted to Congress Giving President Broad Control Measures

WASHINGTON.—The second round of administration demands for legislation to control the national economy was submitted to Congress last week through Rep. Brent Spence of Kentucky, chairman of the House banking and currency committee.

The measure would give the President a broad measure of control over the industry of the country, and considerable significance was seen in the fact that while it refers generally to "essential metals, minerals, and other raw materials" the only commodity named specifically is liquid fuels.

In a lengthy and argumentative preamble, the bill charges that shortages, high prices, and other "adverse conditions" threaten to persist unless remedied and declares it to be the policy of Congress to encourage maximum production and supply, improve the distribution of essential materials, and discourage price movements which impede economic stability.

"5-Year Plan"

In effect, the measure sets up a "5-year plan" for the United States under which the President may designate any essential material or facility in which a critical shortage exists or is threatened, then determine approximately the quantity goals to which it is necessary and feasible to increase the supply "within a reasonable period of time," explore the extent to which such goals can be attained by private enterprise, and develop "such federal programs at home and abroad as may be needed to supplement the efforts of private enterprise in achieving the quantity goals for such materials and facilities."

A subsequent section provides that whenever the President determines that federal procurement is necessary to help achieve these quantity goals for essential metals, minerals, and other raw materials, "including liquid fuels," he may purchase such materials abroad either for government use or for resale in the United States, "particularly to small or independent enterprises," and may also make such purchases in the United States, "particularly from small or independent enterprises," for government use, including resale to private industry for consumption in filling of government contracts or orders for materials or facilities for the national defense.

Throughout the measure considerable emphasis is laid upon the small or independent enterprises, as in another provision that, as a further step toward the achievement of quantity goals, the President may make loans to private industries, "particularly small or independent enterprises," or to state governments or subdivisions or their instrumentalities for the expansion of capacity and production.

One section of the bill [205(a)] is not to be used "except when, in the judgment of the President, all other practicable measures have been taken to increase production and supply through the improved utilization of existing capacity, the expansion of capacity by private enterprises has been explored to the utmost, and other measures within the limits of existing statutory authorization, including the authorization contained in this Act, or any combination of such measures, have not or would not be sufficiently effective to accomplish the purposes of this Act."

This section authorizes the President to construct new plant facilities or expand or rehabilitate existing facilities, by or under contract with private enterprise, but only if private enterprise is unwilling to undertake such activities with the assistance of government loans. Any such plants as may be built are to be operated by private industry under contract.

Again revealing the administration's interest in petroleum and synthetic liquid fuels, the bill cautions that all of the powers granted the President "shall be exercised with due regard for the proper use and conservation of the nation's natural resources," the welfare of small or independent enterprises, the promotion of the purposes of the antitrust laws, the promotion of private competitive international trade, the industrial development of undeveloped areas of the nation, "and the location of industry with respect to considerations of the national security."

These authorities would terminate June 30, 1954—a 5-year program for the development of capacity for the production of steel and other scarce commodities which the administration contends industry will not provide, and the development of a synthetic-liquid-fuels industry should opportunity arise.

Other Provisions

Also provided in the bill are the authorities to impose priorities, allocations, and price and wage controls included in President Truman's "Fair Deal."

Voluntary priority and allocation plans are provided for, under government direction and guidance, backed by provisions for mandatory controls where necessary "to relieve or prevent a shortage or maldistribution of materials or facilities which is affecting adversely or threatening to affect adversely essential requirements of the domestic economy . . . the cost of living, the national security, or the carrying out of the foreign policy of the United States."

The price-control authority would be extremely broad—applicable to any commodity on which price increases would affect significantly "the cost of living, the costs of industrial or agricultural production, or of construction, or the costs of national defense or foreign aid."

Under this section, the sellers of such commodities would be required to give up to 60 days' notice of intended price increases, and they could be called in for public hearing. Barring action by the President, the proposed increases could be made effective at the termination of the 60-day period, but the President could, within that period or later, establish or adjust maximum prices on the basis of December 1948 levels.

Provision is made for a temporary wage board to determine whether proposed wage increases are justified to compensate for increases in the cost of living, correct inequities in the wage structure, correct substandards of living, or maintain essential production at levels certified by the President. No increase not meeting one or more of these requirements could be considered as an increase in cost of production for the purpose of adjustments in price ceilings.

The priority, allocation, price, and wage controls would expire on June 30, 1951.

Industry Plans to Submit Ideas on Tidelands

WASHINGTON.—Plans for presentation of the oil industry's position on the tidelands, if and when congressional hearings are called on the subject, were discussed here last week at a meeting of oil-industry-association representatives.

The meeting was suggested by Rep. Ken Regan of Midland, Tex., with a view to having the oil industry present a united front if hearings are called by House or Senate committees on the several tidelands bills now pending in Congress. Bills calling for recognition of state ownership of the tidelands, as well as measures providing for federal administration, have been introduced.

So far, there has been no indication that any of these bills would be brought up for committee consideration in the near future, but some members of Congress may seek hearings in the course of the next few weeks.

Both proponents and opponents of federal acquisition of the tidelands have admitted there is little chance of either side winning this year.

Middle East Oil Being Dumped in U. S., I.P.A.A. Attorney Charges

WASHINGTON.—Middle East oil is being sold for lower prices in the United States than in Europe in violation of the Anti-Dumping Act of 1921, it was charged last week by L. Dan Jones, attorney for the Independent Petroleum Association of America.

Testifying before the Senate foreign relations committee on extension of the European Recovery Program, Jones declared this situation is a result of a provision in the Foreign Aid Appropriations Act that ECA shall not finance purchases of bulk commodities at prices higher than the domestic market price, adjusted for differences in cost of transportation, etc.

Jones charged this provision is interpreted by the Economic Cooperation Administration to mean that the prevailing domestic price shall be the basis for the price paid for purchases of oil outside the United States, with the result that instead of setting a ceiling on prices it actually serves to set them.

ECA statistics show that the f.o.b. prices for Middle East crude moving into Marshall plan countries ranges from $2.01 to $2.20 per barrel, Jones said, while at the same time "there is evidence that Middle East oil is now coming into the United States at a price which nets the Middle East exporter less than the $2.01 or $2.20."

Subsidy by Taxpayers

"In effect, this constitutes a subsidy by American taxpayers to Middle East oil which is now flooding United States markets at a 'dumping' price," Jones declared. "We do not believe that Congress intended that the ECA program be administered in a way that would create such a situation."

Jones also charged that the ECA program is "directly benefiting the competitive position of the few large oil companies that dominate world-wide petroleum trade" through the requirement that the procurement of petroleum and products be made from sources outside the United States to the maximum extent practicable. Pointing out that 90 per cent of foreign reserves outside the United States and Russia are owned by seven corporations, he said the effect of this provision, adopted because of the world shortage of oil which prevailed last year, has funneled more than two-thirds of the $355,000,000 expended for oil under ERP last year to these seven companies and their affiliates.

With the overcoming of this world shortage, he told the committee, there no longer is need for this requirement and it should be removed from the new legislation.

Instead of facing a shortage, Jones said, "today the world is faced with a surplus of oil which is reflected in the United States by rapidly increasing and unneeded imports of foreign oil. As a result, oil inventories in this country have reached excessive levels which are having the effect of retarding the normal efforts of the domestic industry." That effect, he commented, is directly evidenced in the reduction of 500,000 bbl. per day in production allowables in Texas, Oklahoma, and Kansas.

Increase in European Refining Capacity Seen

WASHINGTON.—European refining capacity, which stood at 370,000 bbl. per day at the close of 1947, may increase to as much as 520,000 bbl. per day by the end of June, "if needed equipment becomes available," it was disclosed last week by the Economic Cooperation Administration in its quarterly report to Congress.

Because of the rapid increase in refining capacity, imports into the Marshall plan countries of refined products during the first half of last year were held to the same level as in the corresponding period in 1947, the report stated, while imports of crude jumped to 158,000,000 bbl. during the period, from 123,000,000 bbl.

France is planning the largest expansion in refining capacity, ECA reported. Moderate increases are scheduled in the United Kingdom, Holland, Italy, and Bizone Germany, and oil companies of the participating nations also plan to increase their capacity in plants outside of Europe.

"The expansion of refining capacity in Europe, as well as the world-wide increase in crude-oil production, are assisting Europe in meeting its fuel needs without creating adverse effects on the European balance-of-payments situation," the agency said.

ECA also emphasized that the oil needs of Europe have been satisfied with a minimum of drainage of United States resources, only 17 per cent of the 58,200,000 bbl. of crude and products financed during the first 9 months of last year being bought in this country.

Most of the purchases in this country were lubricating oils and aviation gasoline, the former accounting for 44 per cent of the total, while the entire authorized procurement of crude constituted less than 2 days' production.

Crude-Oil Imports Reach New High for December

WASHINGTON.—Imports of crude petroleum hit a new high level in December, when 14,062,000 bbl. valued at $33,300,000 were cleared for consumption, it was reported last week by the Department of Commerce.

The December imports were nearly 5,000,000 bbl. above the 9,308,000 bbl. valued at $18,200,000 entered in the same month in 1947 and nearly 200,000 bbl. above the November 1948 receipts of 13,885,000 bbl. valued at $30,800,000, the department said.

Imports of gas and fuel oil also showed an increase over November, 5,465,000 bbl. valued at $12,300,000 against 4,621,000 bbl. valued at $10,300,000, but were well below the December 1947 receipts of 6,262,000 bbl. valued at $10,000,000.

Exports of crude showed a decline, totaling 3,068,000 bbl. valued at $9,100,000 in December against 3,192,000 bbl. valued at $9,600,000 in November and 4,520,000 bbl. valued at $10,900,000 in December 1947, the department announced.

Foreign shipments of gas and fuel oil, however, increased to 1,974,000 bbl. valued at $6,000,000 from 1,776,000 bbl. valued at $5,600,000 in November, and 1,378,000 bbl. valued at $3,300,000 in December 1947. Both motor fuel and lubricating oil showed sharp increases, the former amounting to 2,471,000 bbl. valued at $12,100,000 against 1,962,000 bbl. valued at $9,600,000 in November, and 2,215,000 bbl. valued at $9,400,000 in December 1947, and the latter totaling 1,135,000 bbl. valued at $18,200,000 against 731,000 bbl. valued at $11,200,000 in the preceding month, and 1,131,000 bbl. valued at $17,400,000 in the final month of 1947.

Gas Conservation Program Planned for Pickton Field

HOUSTON.—Representatives of Humble Oil & Refining Co. disclosed details of a planned gas conservation program for the Pickton field of Hopkins County at a Texas Railroad Commission hearing last week.

A Humble representative reported that a gasoline plant was 35 per cent completed in the field to process all casinghead gas produced. Present plans are to reinject 15,000 M.c.f. of gas daily into the reservoir. It is expected that recovery will be increased from 3,260,000 bbl. to 4,500,000 bbl.

International

WORLD-WIDE OIL DEVELOPMENTS

Trend of Rising Foreign Output Tapered Off in December

CRUDE-OIL production figures for countries outside the United States indicate that the steadily rising upward trend was checked in the month of December.

Major producing areas in Latin America and the Middle East showed little change, and indicated foreign output, exclusive of Russia and Eastern Europe, was 3,368,800 bbl. daily in December, a gain of only about 16,000 bbl. daily over the total shown in compilations the previous month.

Venezuela's December production was 1,362,000 bbl. daily, practically unchanged from November. In the Middle East, a slight decline in production in Saudi Arabia balanced the continued increase in Kuwait to 211,400 bbl. daily in December.

Considering Russia and Eastern Europe for which only general estimates are available, total foreign production in December approximated 4,095,000 bbl. daily.

Oversupply Causes Cutbacks

Foreign production has been characterized by an almost unbroken upward curve since the end of the war, but in recent months, evidence that supply has reached the demand level has occasioned cutbacks in some areas. Creole Petroleum Corp., world's largest producing company, is now running about 100,000 bbl. daily under the company peak of last fall. This reduction was caused by the oversupply of heavy Venezuelan fuel-oil type crudes.

Kuwait Oil Corp., Ltd., announced its total 1948 production amounted to 6,291,577 tons, or approximately 127,000 bbl. daily. Production the last 6 months of the year was 4,260,443 tons, an increase of more than 100 per cent over the first 6 months' total of 2,031,134 tons.

Final December figures for Anglo-Iranian Oil Co., Ltd., largest Middle East producer, are not yet available, but the company's output is estimated about 555,000 bbl. daily for the month. Production of Iraq Petroleum Co., Ltd., continued at about half the normal rate due to the closing of the Kirkuk-Haifa pipe line.

WORLD CRUDE-OIL PRODUCTION

Country—	December or latest reported	Previous month
Argentina	64.9	61.9
Bolivia	1.9	1.5
Brazil	0.5	0.4
Canada	40.8	38.9
Colombia	*82.5	81.9
Cuba	*0.3	0.3
Ecuador	6.0	6.0
Mexico	160.6	160.7
Peru	41.1	38.0
Trinidad	*54.8	54.3
Venezuela	*1,362.5	1,362.0
Western Hemisphere	1,815.9	1,805.9
France	0.9	1.0
French Morocco	0.3	0.3
Germany (Western zone)	*13.5	13.1
Italy	*0.2	0.2
Netherlands	*11.4	11.6
Egypt	*38.9	39.3
United Kingdom	*0.9	0.9
Europe and Africa	66.1	66.4
Bahrein	*30.0	30.4
Iran	555.0	551.0
Iraq	*53.1	52.5
Kuwait	*211.4	198.0
Saudi Arabia	*466.4	481.8
Middle East	1,315.9	1,313.7
British Borneo	62.0	58.1
Burma	0.6	0.6
China	1.8	1.9
India	5.1	5.1
Indonesia	93.0	92.4
Japan	3.2	3.5
New Guinea	4.0	4.0
Pakistan	1.2	1.3
Far East	170.9	166.9
Foreign less Russia and Eastern Europe	3,368.8	3,352.9
Albania	1.0	1.0
Austria	17.4	17.4
Czechoslovakia	0.4	0.4
Hungary	9.3	9.3
Poland	2.6	2.8
Romania	82.8	80.0
Russia	612.0	612.0
Yugoslavia	1.1	1.1
Russia and E. Europe	726.6	724.0
Total foreign	4,095.4	4,076.9

Official 1948 figures have been announced for Colombia. The year's daily average was 66,771 bbl., against 70,415 bbl. daily in 1947. The figures include a small amount of condensate.

Canada, fast becoming a leading Western Hemisphere producing country as a result of the Alberta discoveries, reported 40,800 bbl. daily in November. Alberta oil production is reported to have reached a new high of 42,464 bbl. daily during the week ended January 17.

January figures, a month later than those in the accompanying tabulation, have been announced by Arabian American Oil Co. Arabian production in January was 523,882 bbl. daily, a gain of some 12 per cent over December.

This tabulation gives the latest available figures on crude-oil production outside the United States. Figures marked with an asterisk are for December, either from official announcements or reliable reports. In other cases, data for November or an earlier month have been carried forward or used as a basis for estimating December production. Russia and the Soviet-dominated countries have been grouped together at the end of the table and totaled separately since data for these areas are the least reliable.

Product Prices Abroad Move to Lower Levels

Scattered reports from several European areas last week indicated that petroleum product prices abroad are moving to lower levels.

The trend is in conformity with current market conditions in the United States. Anglo-American Oil Co., Ltd., and Shell have announced reductions of a halfpenny (about 0.85 cent) per Imperial gallon in heating oil and gas oil in England. A decrease in import prices similarly led to a reduction in heating-oil prices in Sweden to about 3.55 cents per liter. In Italy, the Italian price control committee cut the price of motor fuel to 115 lire (about 27 cents) per liter (1 liter is about 1.06 quarts).

Jersey Standard to Acquire Half Interest in Two Italian Plants

STANDARD OIL CO. (N.J.) has signed agreements to acquire a half interest in refineries at Bari and Leghorn, Italy.

The interest will be through a new operating company to be formed by Jersey Standard and ANIC (Azienda Nazionale Idrogenazione Combustibili), the present wholly Italian owners of the refineries. Combined capacity of the two plants is about 16,000 bbl. daily, and plans for their modernization are under consideration.

The move is another of several recent developments affecting the refining industry in Italy. Earlier this month, California Texas Oil Co., Ltd., announced plans for a new 10,000-bbl. refinery to be built in the Po Valley with the Fiat company.

At La Spezia, "Nafta" Soc. Italiana del Petrolio ed Affini (Royal Dutch-Shell) has commenced work on the expansion of the refinery there, according to reports from Italy. New facilities with a capacity of about 10,000 bbl. daily and designed to produce high-octane gasoline are under construction.

Refinery Expansion Under Way

Jersey Standard's Italian affiliate, SIAP (Standard Italo-Americana del Petrolio), has recently completed reconstruction and enlargement of its terminal and bulk plant at Vado Ligure (Savona). The terminal is the largest of seven such installations which the company has in Italy, and is used to supply products to northern Italy and Switzerland. Storage has been provided for about 470,000 bbl.—more than the prewar capacity.

Reports from Italy also say an unidentified Austrian oil group has asked government authorization to build a refinery at Monfalcone in the Gulf of Trieste with a capacity of about 7,000 bbl. daily. However, it is known that a number of permits for new refinery construction have been filed with the government, and many of these projects are not likely to materialize.

The Jersey company's announcement dealing with the purchase of the half interest in the new company to own and operate the Bari and Leghorn plants pointed out the products will be marketed in Italy through SIAP. It said the properties to be acquired by the new company are currently valued at $12,000,000. The two refineries before the war had a capacity of about 6,000 bbl. daily each. The Bari plant, which had hydrogenation equipment, was forced to close, and the Leghorn refinery was badly damaged.

Both have now been rehabilitated and capacity increased to the present rate, using Middle East crude. SIAP now operates a 2,500-bbl. daily capacity refinery at the internationalized city of Trieste.

Moffett Gets Judgment In Suit Against Aramco

JAMES A. MOFFETT, former federal Government official and oil-company executive, received a $1,150,000 judgment against Arabian American Oil Co. in federal district court in New York February 15.

Moffett sued the company for compensation which he claimed was due him as a result of his efforts in Washington during the early part of the war protecting Aramco's concession in Saudi Arabia. Though Moffett has asked $6,000,000, the $1,150,000 awarded by the jury was said to be one of the largest judgments ever returned in behalf of an individual in federal district court.

The verdict was the outcome of a 2 weeks' trial in which Moffett testified that, because of his close friendship with President Roosevelt and other federal officials, he had been sent to Washington when Saudi Arabia threatened to cancel the Aramco concession if it did not get $30,000,000 to make up for revenue lost because the war cut into pilgrimages to Mecca. Moffett maintained that his work resulted in instructions by the United States to Britain to take care of Saudi Arabia's needs out of a $425,000,000 loan by the United States to Britain.

The company contended Moffett had never been engaged to protect the concession and that, in any case, his position was that of a "super-errand boy." After the verdict, the company attorney moved to set the judgment aside, maintaining that it was contrary to law and the evidence and also declaring that "no man can make a contract to sell his influence with public authorities."

Judge Edward A. Conger set March 10 for filing of briefs on this motion. A company official said the verdict will be appealed if it is denied.

Moffett also has pending in district court two other damage suits, one a $1,000,000 slander action against James McGaregill, former Standard Oil Co. of California official, and a second asking about $200,000 "out-of-pocket" expenses against California Standard, The Texas Co., and subsidiary companies.

Moffett, who is 62, retired in 1943 after 37 years in the oil business. He began as a clerk in the old Vacuum Oil Co. In 1924 he became a director of Standard Oil Co. (N.J.) remaining until 1933 when he contends he was fired from this $125,000-a-year position. In 1934 he was made Federal Housing Administrator, serving a year, and in 1936, he was named chairman of the board of California-Texas Oil Co.

Barber Sells Trinidad Asphalt Properties

Barber Oil Corp. announced recently that it had sold its asphalt properties on the island of Trinidad in the British West Indies to the Previte interests of London.

For the last 60 years, the Previte family has been associated with Barber in marketing the Trinidad asphalt in England and on the continent. Under terms of the sale, Barber keeps its oil-storage and terminal facilities at Brighton, Trinidad, and its royalty interests in nearby properties, according to T. Rieber, Barber president.

The properties sold included the lease held by Barber from the government on Pitch Lake in Trinidad. The lease expires in 1956. Also involved was the asphalt-processing equipment.

Trinidad property retained by Barber includes royalty on about 3,000,000 acres and approximately 500,000 bbl. of storage. Barber's principal interests are its wholly owned Trinidad Corp. conducting tanker operations, a half interest in American Gilsonite Co., and a 28 per cent stock interest in American Republics Corp.

Royal Dutch Co. Considers Proposal Changing Its Name

The Royal Dutch Shell Co. is considering a change in name to N. V. Koninklijke Nederlandsche Petroleum Mij. (Royal Netherlands Petroleum Co., Ltd.) The company, which was incorporated in 1890, has been Koninklijke Nederlandshe Mij. tot Exploitatie van Petroleum Bronnen in Nederlands Indie (Royal Netherlands Co. for the Exploitation of Petroleum Resources in the Netherlands Indies).

The proposal, along with various financial changes, was submitted to stockholders at a recent meeting in The Hague. The company holds a 60 per cent interest in the Royal Dutch Shell Group.

Oil is discovered at Wady el Feiran on the Sinai Peninsula, near the Anglo-Egyptian oilfields

Possibility of Large-Scale Oil Development Seen for Suez Gulf Area of Egypt

International
WORLD-WIDE OIL DEVELOPMENTS

by Dahl M. Duff

RECENT activity in the Asl and Sudr fields on the Sinai Peninsula has drawn attention to the entire outlook for large-scale oil development in the Suez Gulf area of Egypt.

Reports on January 12 that the third producer in Asl tested at a rate of nearly 40,000 bbl. daily created considerable excitement in Cairo and elsewhere. Egyptian officials spoke of doubling the country's present production and meeting the petroleum import deficit as a result of the new well.

Socony-Vacuum Oil Co., Inc., has since clarified the first early reports on the productivity of Asl 5. The company confirmed that during two short tests the well flowed at a rate of 27 bbl. a minute.

However, "when properly hooked up and tested with conventional methods," Asl 5 flowed at the rate of 3,400 bbl. daily through open tubing and at 1,615 bbl. daily on 7/16-in. choke. This approximates the rate of other of the better wells in the area.

For the entire Gulf of Suez region, a considerably less optimistic view than that taken by some Egyptian Government officials appears to be in order. The Suez graben in which the new Egyptian fields are situtated is characterized by a highly uncertain geology, and it is said that they cannot be compared in any way tectonically to the prolific fields of the Persian Gulf which are 900 to 1,000 miles southeast.

Another consideration of major importance in appraising Egypt's future prospects is the regulatory climate which is at present highly unfavorable. Regulations promulgated earlier this year for the administration of the new oil law are practically a case study of what a nationalistic government can do to impede operations by foreign oil companies without actually prohibiting them.

As the situation now stands, it is entirely possible that one or more of the three companies now in Egypt—Socony-Vacuum, Anglo-Egyptian Oilfields, Ltd., and Standard Oil Co. of Egypt—may withdraw entirely unless some revision of present regulations is worked out.

Reports from Cairo in mid-February said Standard Oil Co. of Egypt had

PRODUCTION DATA OF EGYPTIAN FIELDS

Field—	Year of discovery	Oil production, bbl. To end of 1948	Oil production, bbl. During 1948	Gas prod., million cu. ft. To end of 1948	Gas prod., million cu. ft. During 1948
Ras Gharib	1938	78,432,347	9,323,315	12,436.9	1,800.4
Hurghada	1913	37,328,584	340,830	.....	.....
Gemsa	1908	1,420,000		.....	.....
Sudr	1946	3,618,197	3,494,230	.....	.....
Asl	1948	.....	Testing	.....	.....
Ras Matarma	....	.....	Testing	.....	.....

	Gas-oil ratio (M.c.f./bbl.)	Number of wells: Completed to end of 1948	Number of wells: 1948 Completed	Number of wells: 1948 Abandoned	Oil wells producing December 1948: Flowing	Oil wells producing December 1948: Artificial lift
Rah Gharib	193	128	4		18	62
Hurghada	...	134	4	3	..	43
Gemsa	...	25				
Sudr	...	14	8		6	
Asl	...	4	2			
Ras Matarma	...	2	2			

	Character of oil: Gravity A.P.I.	Character of oil: Sulfur per cent	Producing formation: Character	Producing formation: Depth to top of producing zone, ft.	Deepest zone tested to end of 1948
Ras Gharib	25°	...	L&S	1,200-2,500	Granite
Hurghada	23°	....	Cg&S	700-2,500	Granite
Gemsa	23°	...	L	400-2,000	Granite
Sudr	23°	2.08	L	2,500-3,100	Lower Cret. Nub.
Asl	22°	2.09	L	2,870-3,870	Eocene
Ras Matarma	19°	....	Cg. LS&S	1,940-2,120	Eocene

temporarily halted exploration work in Egypt. It declared the company regarded the new government regulations as too hampering in its operations.

Of the new Gulf of Suez fields, Asl is about 10 miles south of Sudr and is the second to be discovered. The Asl discovery was spudded in by Socony-Vacuum August 25, 1947, following an earlier dry hole by Anglo-Egyptian. Asl 2 was completed January 26, 1948, at a total depth of 3,910 ft. and after acidizing tested initially 3,060 bbl. daily of 22°-gravity oil through 2½-in. tubing.

The first field on the east side of the Gulf of Suez was discovered in May 1946 when Sudr 1, drilled by Anglo-Egyptian, was completed pumping 367 bbl. daily of 22°-gravity oil. Under an earlier agreement, Socony-Vacuum and Anglo-Egyptian share equally in all production obtained by either company on the peninsula south of the thirty-first parallel.

Asl field has been brought into commercial production only in the last few weeks. This was made possible by the completion of a 12-mile, 6-in. pipe line extending from the field to the Sudr terminal on the gulf.

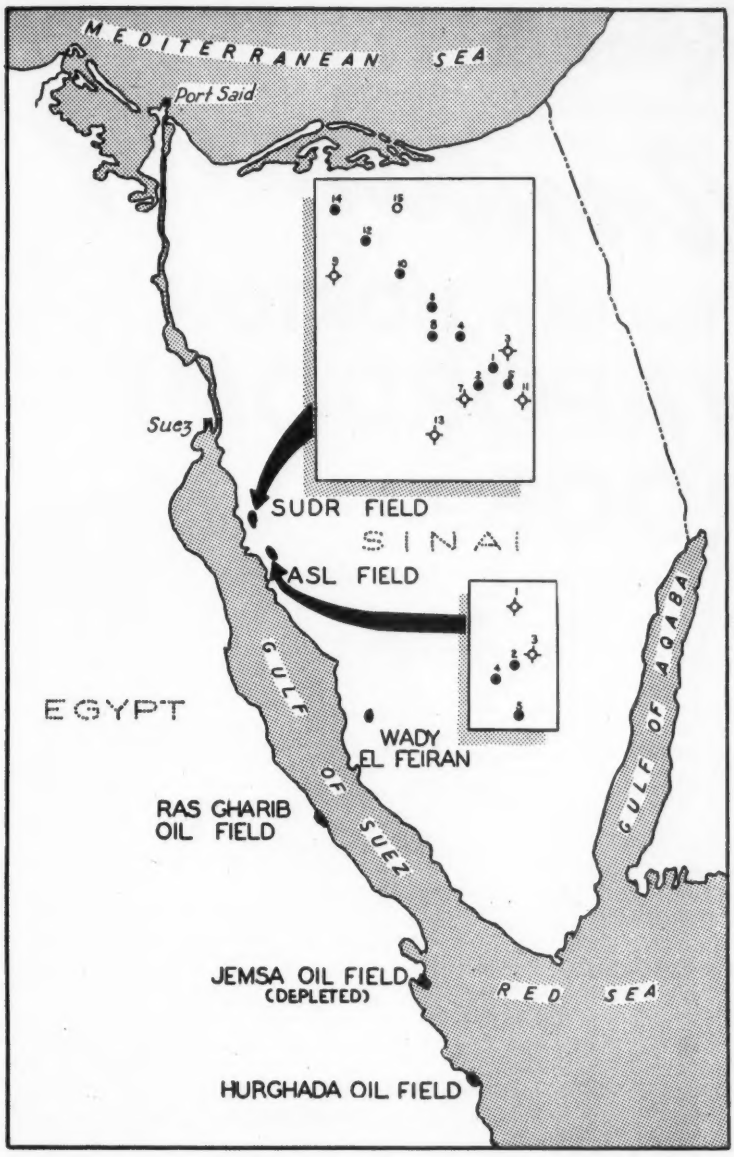
Of the five Asl wells drilled—four of them by Socony-Vacuum—three have been productive, and on this basis, about 200 acres can be considered as proved in the field. Asl 4, located 1,300 ft. west of No. 2, went to 3,334 ft. and tested 3,000 bbl. daily through open tubing. Asl 5, about 2,600 ft. south of No. 4, is reported to have been first tested through the annulus. The single rig used in the field has been moved to commence No. 6 on line with Nos. 3, 2, and 4.

Anglo-Egyptian, the operator in Sudr, is now drilling well 15 in that field. Of the 14 completed wells, 9 are producers, and the field's output last October averaged 14,384 bbl. daily. The oil moves through a 6-mile, 6-in. line to the Sudr terminal on the Gulf of Suez. The terminal has 60,000 bbl. of tankage and one 12-in. underwater loading line.

Economic per well production in Asl and Sudr fields is estimated at between 1,500 and 1,800 bbl. daily.

One rig also is being used in Sudr where average drilling and testing time approximates 40 days. Casing program in the field is to run 9⅝-in. 36-lb. casing to about 200 ft. and 7-in. 20-lb. casing to the top of the producing zone. The wells are completed through 2½ or 3-in. tubing.

Sudr and Asl fields are each located on a 10,000-hectare block (24,710 acres). Between these fields is another area, Ras Matarma, on a 1,500-hectare block (about 3,700 acres)



Map of the producing fields of Egypt and (inset) well locations of the Sudr and Asl fields

where Anglo-Egyptian is drilling with another rig. A third well in the area is now below 3,600 ft.

Immediately south of the Asl area is another 10,000-hectare block, Nebwi, where Anglo-Egyptian is now drilling a second well below 4,600 ft. Farther south is the Lagia block, also 10,000 hectares, where Socony-Vacuum is the operator. The company is now drilling below 2,000 ft. on a third well which is reported to have promising shows.

Farther south, about 50 miles below Asl on the east coast of the gulf, Standard of Egypt announced January 24 that it had struck oil in a wildcat at Wady el Feiran. This well tested about 175 bbl. daily through ¼-in. choke. It was the first successful completion for this company in 12 years of exploratory effort in Egypt.

Geophysical activity in the Gulf of Suez region includes a seismograph party by Socony-Vacuum, gravity work by Anglo-Egyptian, and three parties, gravity, seismograph, and magnetometer, by Standard of Egypt.

These three companies are the only ones to engage in the partially successful search for oil in Egypt. Anglo-Egyptian is a Shell-controlled company. Standard of Egypt is an affiliate of Standard Oil Co. (N.J.).

The recent discoveries followed years of wildcatting. Within the last few months, the companies relinquished their exploration permits for the western part of Egypt and abandoned a lengthy and expensive program in that area after negative results.

Officials of the companies themselves are careful not to overemphasize the importance of the Suez discoveries. Asl and Sudr produce from

Announcing

The NEW HORTON VAPORDOME ROOF

Here's another HORTON vapor-saving device which allows still more Flexibility in your plans to prevent evaporation losses . . .

This cutaway view shows a flat-bottom oil storage tank with a Vapordome Roof. The flexible membrane inside the dome is made of petroleum-resistant rubber-coated fabric. It moves up and down as the air-vapor mixture in the tank expands and contracts. No vapor is vented until the dome is full.

Patent Applied for.

CHICAGO BRIDGE

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Chicago, 4	2128 McCormick Bldg.	Atlanta, 5	2154 Healy Bldg.	Philadelphia, 3	1615-1700 Walnut Street Bldg.
New York, 6	3347-165 Broadway Bldg.	Birmingham, 1	1536 North 50th St.	Havana	402 Abreu Bldg.
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Los Angeles, 14	1523 General Petroleum Bldg.	Houston, 2	2119 National Standard Bldg.	Detroit, 26	1514 Lafayette Bldg.

THIS is the newest member of the Horton family — the Vapordome Roof — developed to meet some of the special problems of storing volatile petroleum products. The Vapordome Roof, designed for use on flat-bottom tanks as shown at the left, is fitted with a butt-welded steel hemisphere supported by three equally-spaced columns. A flexible hemispherical membrane inside the dome provides an expansible vapor space. It allows the air-vapor mixture above the stored liquid to expand as the temperature increases without being vented and lost.

In operation, the Vapordome is similar to the Horton Vaporsphere. It can, however, be adapted more economically (a) when a flat-bottom tank is being re-roofed, (b) when there is no ground space for a Vaporsphere, and (c) when a new tank is being installed to operate independently or as the central unit of a vapor saving system. There will be other situations, too, where the Vapordome Roof will do an efficient job of cutting down evaporation losses from products such as crude oil and gasolines—situations where the design of the new roof makes it the most practical and economical vapor-saving device available.

If you want to know how the Vapordome Roof will fit into your storage plans, ask our nearest office to give you full details.

Advantages

. . . of the Horton Vapordome Roof

EASILY INSTALLED: A Vapordome Roof can be installed on a new tank, or an existing tank needing a new roof.

DEPENDABLE OPERATION: Complete protection of all moving parts from the weather and simplicity of vents, gauges and other tank fittings insures continuous and dependable operation of the Vapordome Roof at all times. The Vapordome Roof becomes an integral part of the tank without interfering with the regular operation of the tank.

LOW OPERATING COSTS: The Vapordome Roof operates automatically by natural forces and, therefore, no operating cost, aside from ordinary maintenance, is incurred.

LOW PRESSURE OPERATION: The Vapordome Roof will operate at a very low pressure, and tanks which are interconnected do not have to be reinforced to withstand internal pressure.

FLEXIBILITY: The rearrangement of the interconnecting piping in a vapor-saving system can be done at any time without taking either the tank with the Vapordome Roof or the other tanks in the system out of service. Additional tanks can be connected into the system at any time, provided the Vapordome Roof has sufficient capacity to handle them.

FIRE SAFETY: The Vapordome Roof and the vapor lines are filled with an air-vapor mixture having a percentage of vapor that far exceeds the upper flammable limit. Danger of flame propagation in the system is, therefore, remote. Since venting is reduced, the danger of fire from exterior sources is minimized.

A Vapordome Roof may be used in connection with an existing vapor-saving system employing a Lifter Roof tank, Vaporsphere, another tank with a Vapordome Roof or a similar device as the vapor storage unit.

The principal steps in designing a vapor-saving system using a Vapordome Roof as the central storage unit are as follows: (1) calculate the required vapor capacity (2) design the vapor lines (3) specify the vents, gauges and other fittings for all of the storage tanks in the system.

(The design procedure is identical with and the calculations are similar to those used for the Vaporsphere, as shown on Pages D-4 to D-11 inclusive in the Vaporsphere Bulletin D. Write for a Vapordome leaflet, and a Vaporsphere bulletin which gives data on how to determine capacity required.)

STANDARD VAPORDOME ROOFS

Capacity in Cubic Feet	Diameter of Dome
5,000	28′ 3″
10,000	27′ 0″
15,000	31′ 0″
20,000	34′ 0″
25,000	36′ 6″
40,000	42′ 6″
50,000	46′ 0″
75,000	52′ 6″
100,000	58′ 0″
150,000	66′ 0″

NOTE: Designs are not limited to above sizes

& IRON COMPANY

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Even record runs are not unusual when you are stabbing and welding ARMCO Casing. For example, on one job the running time for 1000 feet of 9⅝ inch, O.D. ARMCO Casing was only 4 hours and 15 minutes—an average of 235 feet an hour!

You always save time with ARMCO Casing because the slip-joint collars and accurately machined pipe ends assure fast line-ups without clamps. Slips and elevators fit the pipe. No special equipment is needed. A few minutes and you have a first-class joint. Field welders say they like to work with ARMCO Casing.

Other advantages include long 40-foot lengths that expedite hauling and handling. This also means fewer joints and less assembly. The collars have uniform wall thickness and there are no costly threaded joints to make up.

Keep in mind that ARMCO Casing is strong yet light in weight—that you can specify the exact size and weight of pipe needed for the job. Diameters range from 8 to 24 inches; wall thicknesses from 3/16- to 1/2-inch. Write for complete information. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 1175 Curtis Street, Middletown, Ohio; 501 Mayo Building, Tulsa, Oklahoma.

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Save running time with slip-joint casing

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CASING

the basal Miocene sands and conglomerates and from Eocene limestone. Gas production is negligible. The oil accumulations are in stratigraphic-type traps in the faulted graben. This makes for unpredictable drilling and bars any normal appraisal of the region.

Sudr and Asl were discovered as a result of surface geology and gravimetric work. Seismograph has been found to be of little definite value unless used in conjunction with the results of actual drilling operations.

The Sudr and Asl discoveries were the first new fields for Egypt since 1938 when Ras Gharib on the west coast of the Gulf of Suez was brought in. Only other producing field in Egypt is Hurghada with about 800 bbl. daily production and also located on the west coast of the gulf. Both are operated by Anglo-Egyptian.

Anglo-Egyptian operates a 35,000-bbl.-daily-capacity refinery at Suez which is supplied by tankers loading crude at Ras Gharib and the Sudr terminal. The Egyptian Government also operates a 1,800-bbl. daily refinery at Suez.

(A second installment of this article covering operations and leasing provisions as they affect oil companies operating in Egypt will appear in an early issue of The Oil and Gas Journal.)

Preliminary Plans Under Way for U. N. Scientific Conference

PRELIMINARY plans are now being made for the United Nations Scientific Conference on the Conservation and Utilization of Resources, a meeting which includes on its program a number of important technical and economic petroleum-industry subjects.

The conference, sponsored by the U. N. Economic and Social Council, was originally scheduled for May and June but the desirability of postponing it to the latter part of the summer in view of the General Assembly extension is now under discussion. Under present plans, it will be held at the U. N. interim headquarters in Lake Success, N. Y.

Estimates of undiscovered oil and gas reserves, exploration methods, labor and safety problems, along with various technical oil-processing and production subjects are listed on the program. The petroleum subjects are included in the 10 half-day section meetings devoted generally to fuels and energy, one of several major divisions of the conference program.

Between 400 and 500 authors are expected to give papers. Invitations were extended to both individuals and institutions by the U. N. after consultation with the governments concerned.

About 75 of the papers will deal with fuels and energy, and of these, about half will be on petroleum subjects. The conference is planned to extend over 15 week days with 12 of these mornings devoted to section meetings and three mornings and the afternoons to plenary sessions.

Among the subjects listed in the revised program for the plenary meetings are: critical shortages, a world review including fuel and energy; economics of competitive fuels for various purposes and their use to meet future fuel requirements; estimates of undiscovered oil and gas reserves, a survey of the relative outlook for increasing world reserves of oil and gas through existing techniques and possible new techniques; methods of resources appraisal, including mapping, aerial surveys, and statistical methods; and, under techniques of special interest to less-developed countries, experience in Venezuela in the application of revenue from depletable resources to the development of other resources.

The 10 section meetings on fuels and energy include three direct petroleum sessions, one meeting on fuel utilization in general, and others devoted to coal and electric power. The three petroleum meetings are:

1. Techniques of oil and gas discovery and production, including geological and geophysical exploration methods, biochemical techniques, new deep-drilling methods, well logging and sampling methods, and cementing procedures.

2. New techniques for increasing production of oil and gas, including conservation, secondard recovery, and oil from shale.

3. Oil chemistry, consisting of a review of present status and trends and discussions of synthetic-fuel production.

The resources conference has long been planned by the Economic and Social Council. At its session in February 1948, the council instructed the secretary-general to proceed with the plans "keeping in mind that the task of the conference is to be limited to an exchange of experience on the techniques of conservation and utilization."

The exact procedure to be followed during the meeting is now being worked out. It is expected that the papers will be reproduced prior to the meeting and distributed to participants in order to stimulate discussion.

The conference is considered as in line with the proposal made by President Truman in his inaugural address for assistance to less-developed countries in making use of their resources. The resolution authorizing the conference declares that it will be devoted "solely to the exchange of ideas and experience among engineers, resource technicians, economists, and other experts in related fields" . . . and that the conference is to be more "scientific related than policy making."

International

Trans-Arabian and Syria Sign Right-of-Way Pact

TRANS-ARABIAN PIPE LINE CO. and the Syrian Government have signed a revised right-of-way agreement which is expected to be submitted and approved by the Syrian Parliament before the end of February.

Exact terms of the agreement were not clear. They were reported to include a guarantee of a certain amount of oil to meet Syrian internal needs.

Lack of a transit agreement with Syria has ranked with the continued failure of the U. S. Government to authorize further pipe exports as the principal obstacles to progress on the partially-built 1,067-mile Persian Gulf-Mediterranean pipe line.

B. E. Hull, president of Trans-Arabian, is now in Damascus where he signed the amended agreement with the government February 2. The first agreement was not submitted to the parliament. Lebanon approved a company concession and has recently completed another agreement with Syria providing for the exchange of certain benefits resulting from the pipe-line construction.

Trans-Arabian already has an agreement with Transjordan but this state may seek revision of the terms to equal those granted Syria. Samir Rifai Pasha, Transjordan's former premier, said in Damascus the Syrian concession gave Syria 200,000 tons a year of refined oil at cost price, makes royalties payable in dollars, and does not exempt the line from all customs duties as does Transjordan. He said he hoped these favorable terms will become applicable to Transjordan.

India Plans Two Refineries

A technical survey committee of eight foreign oil experts is now in Madras, India, studying the proposed construction of two refineries in India, one on the east and one on the west coast. Reports are a plant of about 40,000 bbl. daily may be established in Madras Province as a result of the combined efforts of several American oil companies.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Uncrystal Ball Gazing

WASHINGTON.—Administration clairvoyants, peering into a murky crystal ball, have come up with predictions of a new inflationary spurt this spring, although a lot of other people, also equipped with prescience, gazing balls, tea leaves, and other paraphernalia of the craft, are prophesying what they optimistically hope will be nothing more than a "mild adjustment" in the economic picture, but admit privately it may look more like a recession to most people.

The President's advisers, dismissing as only temporary phenomena the cutbacks in production, layoffs of labor, and declines in agricultural prices which have been noted in recent weeks, are pressing firmly for congressional enactment of all of Truman's antiinflation legislation.

Bills Are Being Written

The bills to put that program in effect are being written, not in Congress, but in the government departments. As they are finished, they are sent to the Capitol and Congress is asked to pass them as is.

The first part of the program, extension of export and rent controls, already is in the congressional mill. The second instalment has been written, and it is in this chapter that industry is going to be given an authoritarian twist.

Wrapped up in one package, the President wants authority for government loans for expansion of key industries with the further authority, apparently aimed at steel, for government construction of additional facilities if industry doesn't expand of its own volition.

Restoration of priority and allocation powers over scarce materials, again aimed at steel;

Standby power to impose price controls on materials in short supply, once more with steel as the principal target;

Authority to purchase essential raw materials abroad for government use or for resale in this country;

Limited powers over wages of workers employed in plants manufacturing articles under price control.

While the administration is anxious to prevent the costs of manufactured products from rising further it is equally anxious to prevent further declines in agricultural prices. To that end it will propose that no ceilings set on agricultural commodities shall be less than parity. The powerful farm bloc in Congress, however, is aiming at a floor under farm prices at 90 per cent of parity; if this is accepted it will enable laid-off workers to buy automobiles for less so they can pay higher prices for food.

Steel Keeping Promises

THE steel industry is aiming at a 96,120,930-ton output this year, and it will take a lot of oil, natural gas, and other stuff to do it.

That production, the industry's slide-rule boys figure, will require more than 47,619,000 bbl. of fuel oil, 300,000,000 M.c.f. of natural gas, and 111,500,000 tons of coal for fuel.

The more than 400 plants making or finishing iron or steel, scattered over 30 states, will need about 130,000,000 net tons of iron ore—nearly 250 tons a minute—and more than 50,000,000 tons of scrap, about 35,000,000 tons of limestone, 1,546,000 tons of manganese ore, 634,000 tons of chrome ore, and 144,000 tons of metallic nickel.

The industry figures on spending $627,000,000 this year on expansions and improvements which will further boost steel output in 1949 to 98,303,930 tons, with a further 500,000-ton increase already projected for 1951. This year's expenditures for expansion will bring the total since the end of the war to approximtely $2,000,000,000.

The steel plants got off to a good start on their promise to produce 96,000,000 tons this year, hanging up an all-time record of more than 8,000,000 tons in January.

Rankled Rankin Retaliates

WITH a view to controlling a rules committee that did not always see eye to eye with the administration, House Democrats jammed a measure through early in the session providing that if the committee bottled up a bill it could be brought up on the floor by demand of the chairman of the committee which framed the measure.

Having thus satisfactorily disposed of a long-standing problem, the House leadership looked forward to a virtual bypassing of the rules committee on the administration's legislative program.

Their complacency was shattered, however, when the first invocation of the new procedure was threatened, not to secure consideration of an administration bill, but to further one which will put the administration very much on the spot—a bill providing pensions for veterans of the last two wars when they reach the age of 65.

The pension bill, not to be confused with a bonus bill which is still in the offing, will cost an eventual 7 billion dollars. It was sponsored and pressed by Rep. John E. Rankin of Mississippi, chairman of the House veterans affairs committee, more or less in retaliation for his having been tossed out of the un-American activities committee, where he had long enjoyed the warmth of the spotlight and the publicity that has surrounded its often far from orderly proceedings.

Rankin is very much in command of the situation. Under the House's own rules he will be able to force his bill on the floor; once on the floor, most members will find it difficult to vote "no" because they will have to campaign for reelection again next year.

So in all probability the House will pass the Rankin bill and hope the Senate will find some way of burying it—deep.

Feudin' and Fightin'

THE work of the House interstate commerce committee is piling up, while incoming Chairman Robert Crosser and outgoing Chairman Charles A. Wolverton feud over offices.

For many years, Wolverton has occupied offices immediately adjacent the committee's hearing room. Crosser, who has to get around in a wheel chair and is sensitive about it, wants the offices arranged so that a door may be cut through the wall and he can get up on the committee's dias without being observed by persons attending hearings.

Wolverton says he is willing to give up the offices, provided he can get comparable quarters, but the best offices all have been taken. Since the offices don't go with the chairmanship of the committee but were assigned to him in regular course, he doesn't have to move and apparently won't move unless he wants to.

Squabbles over space aren't confined to the Capitol, however. "Downtown," enforcement of the Taft-Hartley Act was temporarily slowed down by a jurisdictional dispute in the National Labor Relations Board over custody of a shower bath.

The board is moving into new headquarters unfortunately equipped with only one private bath and shower, and that in offices that Robert H. Denham, general counsel, had earmarked for his own. Board Chairman Paul M. Herzog felt that he needed a bath as badly as Denham,

You don't call him every day...

Not every day . . . not every year . . . but when you do need fire protection, you need it badly. And, too, you know the importance of fire prevention in putting off the day when you have to call for this kind of help in a hurry.

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UOP

New 380-mile oil line links Crane County and Gulf Coast

Start of line at Refugio, Texas tank farm. Contractor for entire job: A. C. Holder Construction Co., Tulsa, Okla. Lincoln 200-amp. "Shield-Arc" welders are mounted on skids, made from 4″, 3″ and 2″ pipe. To move, "Cats" simply hook onto log chain on skid and haul away.

Stove-pipe method of joining pipe is used throughout. Joints are beveled butt welds. Pipe ends are lined up with clamp and tack welded. First pass made with 5/32″ electrode . . . second and third with 3/16″. Lincoln "Fleetweld 5" is used throughout.

Fabricating bullplug. These are welded on ends of 600 ft. sections and 100 lbs. of air put into pipe for 24 hrs. to test for tightness. Bullplugs are also used on sections pulled through road-crossing tunnels.

Latest model of "Shield-Arc" 200-amp. welder used on the job. The oil country buys more of these "Shield-Arc" 200-amp. welders than any other type. Easy to use. Light-weight, compact. Idling device throttles engine down when not welding. Rugged, industrial type 29 hp. engine.

The above is published by **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*

Full details on 200-amp. "Shield-Arc" in Bul. 312. Write The Lincoln Electric Company, Dept. 227, Cleveland 1, Ohio.

insisted that he should get the choice location and won his point.

Thereupon Denham, still wanting a shower, went to the Public Buildings Administration and induced them to put one into the suite he will occupy at the other end of the corridor.

It cost an additional $1,000 to make everybody happy and clean.

Oil Eschews China

FEDERAL officials haven't said anything about it, but very quietly a few weeks ago they put the Indian sign on exports to China of all commodities on the positive list.

Shortly after Chiang Kai-shek decided to take a vacation and left the nationalist government coming apart at the seams, the Office of International Trade decided to approve no further export applications while the administration took another look at the situation to determine whether it was worth while to send more aid across the Pacific.

In the past 11 months, the United States has financed $195,648,000 worth of commodities for the Chinese Nationalist Government, $46,000,000 of it petroleum products. Reports from China spoke of Communist troops with American equipment which they had captured, stolen, or bought from the nationalists, and their almost uninterrupted march across the country raised questions in Washington whether this Government should further — if indirectly — supply Chiang's enemies.

No formal announcement has been made of the suspension of export licenses for China, but numerous conferences of administration officials have been going on behind closed doors to see what, if anything, now can be done to halt the Communist advance which foreshadows the dropping, soon, of another iron curtain.

No further licenses are expected to be issued until a decision is reached on that point, and since it appears nothing much can be done short of armed intervention, which is out of the question, it is possible that trade with China will be stifled indefinitely.

Group to Seek Quebracho Substitute

WASHINGTON. — John R. Suman, Standard Oil Co. (N.J.), New York, has been named to head a National Petroleum Council committee set up by Chairman Walter S. Hallanan to explore for substitutes for quebracho for use in drilling muds.

The investigation was requested by the munitions board through the Interior Department because of the possibility of a shortage of quebracho in the event of an emergency.

Quebracho supplies, procured entirely from Argentina and Paraguay, are used, about half and half, in the tanning of leather and the drilling of oil wells. In view of the difficulties encountered in Argentina during the last war, the possibility that quebracho supplies might be cut off in the event of another emergency has served to focus attention upon the problem.

Both the leather and oil industries now are seeking substitutes for the material, but the former has found no other tanning agent of comparable qualities. Since the initial announcement that the munitions board was interested in the matter, however, offers of substitutes for quebracho for drilling purposes have been received from a number of chemical manufacturers who believe their products may be suitable for drilling muds.

Suman's committee, as announced by Hallanan, will consist of the following:

George S. Bays, Stanolind Oil & Gas Co., Tulsa; George E. Cannon, Humble Oil & Refining Co., Houston; Harold Denton, Sun Oil Co., Beaumont, Tex.; H. F. Fisher, Phillips Petroleum Co., Bartlesville, Okla.; P. E. Jones, Union Oil Co. of California, Wilmington, Calif.; William M. Keck, Jr., Superior Oil Co., Los Angeles; Hallan N. Marsh, General Petroleum Corp., Los Angeles; J. S. Morris, American Association of Oilwell Drilling Contractors, San Antonio, Tex.; George L. Ratcliffe, National Lead Co., Los Angeles; Walter F. Rogers, Gulf Oil Corp., Houston; A. H. Rowan, A. H. and C. L. Rowan, Fort Worth; R. S. Shannon, Pioneer Oil Corp., Denver; and Carey R. Wagner, Drilling Specialties Co., Bartlesville, Okla.

A.I.C.E. Schedules Two Symposia on Refining

A symposium on catalytic cracking and another on bubble-plate phenomena will hold the interest of oil-industry representatives attending the regional meeting of the American Institute of Chemical Engineers in Los Angeles March 6-9.

Papers to be presented in the catalytic-cracking symposium include: "Effect of Reactor Temperature on Product Distribution and Quality in Fluid Catalytic Cracking," by C. R. Olsen and E. R. Sterba, Universal Oil Products Co., Chicago; "Commercial Performance of Silica-Magnesia Cracking Catalyst," by A. L. Conn and W. F. Meehan, Standard Oil Co. (Ind.), Whiting, Ind.; "Conversion and Product Distribution in Thermofor Catalytic Cracking," by R. A. McKean and L. F. Grandey, Union Oil Co. of California, Wilmington, Calif.; and "Correlations of Product Distribution and Process Variables in Moving Bed Catalytic Cracking," by J. W. Schall, J. C. Dart, and C. G. Kirkbride, Houdry Process Corp., Marcus Hook, Pa.

Papers to be presented in the bubble-plate phenomena symposium include: "Plate Efficiencies in Extractive Distillation," by C. L. Dunn and G. J. Pierotti, Shell Development Co., Emeryville, Calif., and Cline Black and Mott Souders, Jr., Shell Development Co., San Francisco; "Aerated Flow Principle Applied to Sieve Plates," by M. J. Hutchinson, A. G. Buron, and B. P. Miller, E. B. Badger & Sons Co., Boston, Mass.; "Pressure Drop Through Bubble Caps," by T. C. Dauphine, Oronite Chemical Co., New York; and "Fractionator Tray Performance and Design," by C. O. Rhys, Jr., Standard Oil Development Co., Elizabeth, N. J.; and H. L. Minich, Esso Standard Oil Co., Linden, N. J.

Voluntary Unitization Hearings Held in Texas

HOUSTON. — Hearings were held this past week on a voluntary unitization bill up before the Texas Legislature and dates were set for public hearings on two important tax bills affecting the oil industry.

Testimony was heard concerning Sen. George Moffett's unitization bill —one of two introduced thus far in the legislature. Moffett calls for specific exemptions from the provisions of antitrust laws in contrast with a bill introduced by Sen. Wardlow Lane which does not contain this feature.

A. M. Walker, Dallas attorney and former University of Texas law professor, testified that the Moffett bill would not violate the state's antitrust laws. He said the bill's intent is to remove the "fear" that cooperative development of oil fields is an antitrust violation.

The two tax bills which have been set for public hearing are both aimed at natural gas. Rep. C. S. McClellan is offering a measure to place a production tax of 1 cent per 1,000 cu. ft. on natural gas. The second proposed natural-gas tax is being sponsored by Rep. Deno Tufares who is asking for 1½ cents per 1,000 cu. ft. of gas at the wellhead.

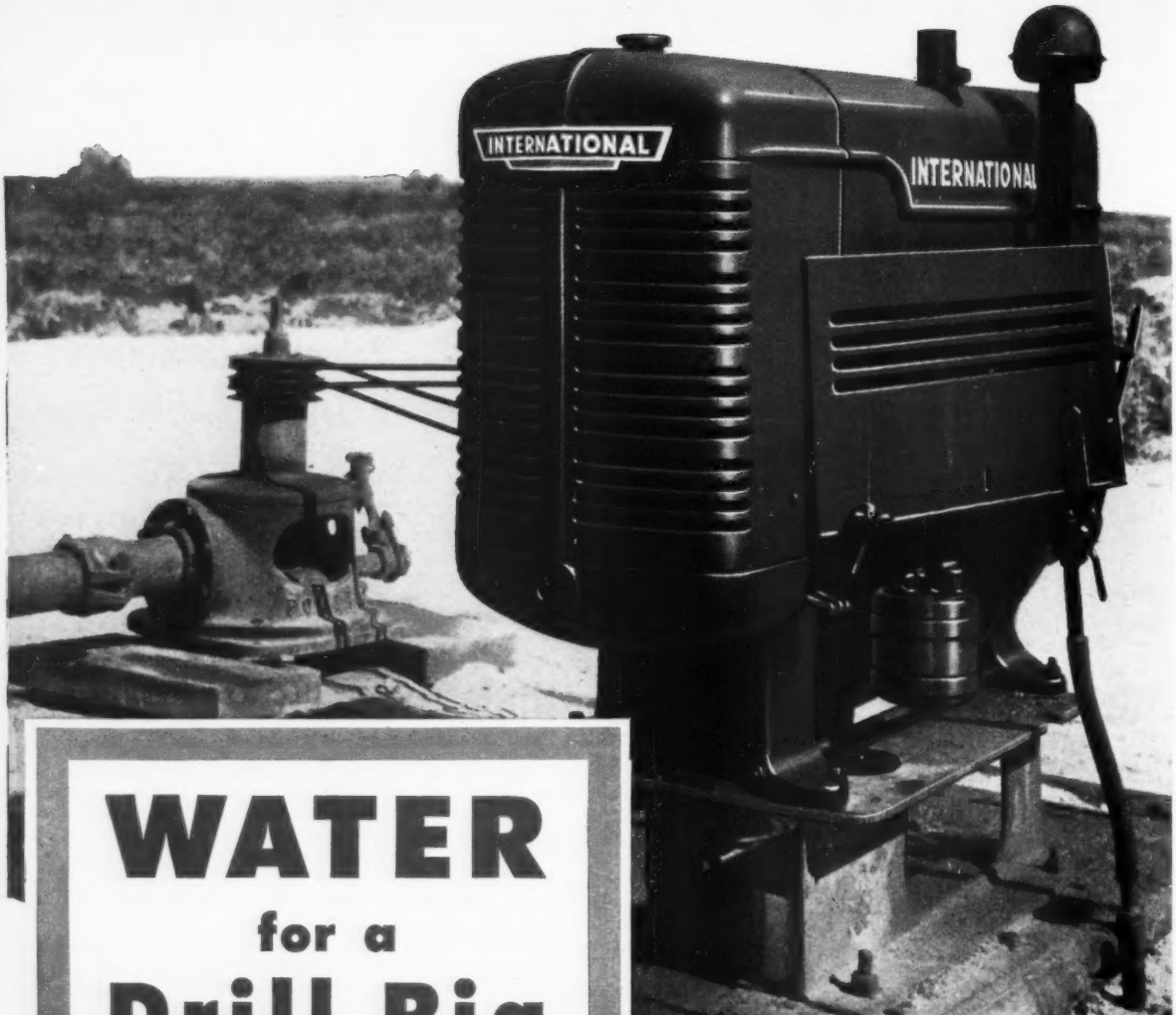
Public hearing by the house revenue and taxation committee on the Tufares bill will be held at 7:30 p.m., February 28. McClellan's proposal will be heard at 7:30 p.m., March 7.

Nothing developed during the week on a bill repealing the state's 4-cent-a-gallon retail gasoline tax and substituting a 1-cent-a-gallon processing tax on all combustible fuels. No public hearing has been set on the bill, and its author, Rep. Davis Clifton, did not state when and if he would ask for a hearing.

Work Started on New Plant

HOUSTON.—Ground has been broken here for a $1,500,000 plant to manufacture antifreeze utilizing natural gas as a basic raw material.

Floz-on Manufacturing Co. of Pittsburgh, according to reports, plans a capacity of 25,000,000 gal. of ethylene glycol for the new chemical plant.



WATER for a Drill Rig

The wide range of power in the International line of Diesel and gas power units, gives you an International power unit for every oil field power need.

Here, for example, is an International U-4 gas power unit driving a deep well water pump for a drilling operation. This compact, economical power package delivers steady power with the same dependability as the big International Diesels capable of handling drill rigs. The same precision manufacturing and top quality materials go into *all* International Power Units, big or small.

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Oil Finding Today Involves a Veritable Army of Specialists

by Reese H. Taylor

BACK in the old days, about 40 years or so, when a stout pair of hobnailed boots or a team of bang tails and a bone-shaking buckboard took the place of a car or a plane, the oil companies used to employ two or three men who were equally expert in exploration, drilling, and production—fellows in California like Billy Loftus, Tom O'Donnell, and Bill Orcutt, These men would travel around the country looking for places to drill. When they found a likely spot they would lease up the land themselves, make their own locations, direct their own drilling operations, supervise the completion of the wells, and even help the pumpers with their production problems.

Now I realize that, by today's standards this was a poor way to run an oil company. But those old-timers must have been shot with luck. For they managed to bring in Santa Fe Springs, Lakeview, Lost Hills, Orcutt, Brea Olinda, and many other California fields by these methods.

How oil is found today.—Today, of course, we know better. Matters are handled with considerable more science. If our vice president in charge of field operations manages to persuade our executive committee that we should explore a new area, the operation is carried on something like this:

The vice president outlines the project to our chief geologist. The chief geologist goes to work and gets a set of aerial photographs made of the area. Then he hands these photographs over to a specialist in photogrammetry. Let's say the study shows the area to be a deep sedimentary basin with several interesting structural features. The chief geologist then sends one of his field geologists into the area to map the structures.

The field geologist finally turns in a report which consists of 70 typewritten pages and 22 maps and sections of the structural features mapped on various horizons.

Problems With Structures

The report shows that some of the structures have too much closure, others have too little; some are noses and lack closures entirely; some are badly faulted and still others are overlain by thick sections of continental beds. It ends with a recommendation that a detailed study of the area be made by a micropaleontologist.

So the micropaleontologist goes out and takes samples from outcrops and core holes. He draws up a paleogeographic map to show the extent of ancient seas that invaded the area and studies hundreds of samples. After that he turns in a 5-lb. report which lists each foram by name and contains several pages of symbols that even the chief geologist can't understand.

With the help of a few translators and interpreters, however, the geological department decides that the paleontology report indicates that facies changes are present. This suggests that the formations under the structures mapped by the field geologist may be too tight to contain oil. The best areas may be in the flatter country between these structures. Consequently, on the recommendation of the micropaleontologist they decide that the area should be further explored by geophysical methods.

The flying magnetometer is employed over the area and the results suggest the presence of a basement

REESE H. TAYLOR

The accompanying material is an interesting and humorous excerpt from Taylor's paper "The Greeks Had a Word for It," delivered at annual A.I.M.E. meeting held last week in San Francisco. While Taylor's comparison of oil-finding procedures of 40-odd years ago versus those of today dramatically points up the extreme specialization now in practice, he said, "We can't operate and develop our modern technologies without specialization. In fact, the further we develop . . . the more specialized we've got to become. So there's no going back to the old methods.

"The real task that we're devoting our talents to is not the classification of forams, the mapping of geological structures or the improvement of secondary-recovery techniques. . . .

"Our real task is providing power and heat and transportation and roads and friction-free machines for people. Only when you combine all the hundreds of special talents that go into the creation and distribution of petroleum products, and then translate these products into terms of what they do for people, does our work mean anything."

The author is president, Union Oil Co. of California.

Shown bringing home a point at an opening session of the national meeting of the A.I.M.E. is Morris Muskat (right), chief of the physics division, Gulf Research & Development Co., Pittsburgh. Muskat spoke on production research during a session of the Mineral Industry Education division on the campus of the University of California. Others at the speakers table are (left to right): R. F. Davis, Chicago petroleum technologist; Everett DeGolyer, Dallas consultant; A. C. Rubel, vice president, Union Oil Co., Los Angeles; and C. A. Heiland, president, Heiland Research Corp., Denver

Other A.I.M.E.-San Francisco material in this issue of the Journal is: "Unitization of Wertz Field, Wyoming," pages 149-150; "Digests of A.I.M.E. Papers," page 166; and "New Induction Well Logging Method," pages 168-170.

Dr. Muskat's second article on "Summarization of Reservoir Engineering" also appears in this issue, page 146.

ridge. Consequently the magnetometer expert recommends that this area be further checked with a gravity meter to determine the extent and shape of the ridge.

The specialist in gravity interpretation submits a map contoured on equal density which shows an anomaly that he suggests indicates the presence of a basement ridge. Then 2 days later he submits a second map of the same area which is based on the second derivative and suggests that the ridge is not present at all. After dropping this bombshell, he recommends that the area be shot by reflection seismograph.

The seismograph party moves into the area and shoots a number of profiles. They submit maps and cross-sections which indicate that the area where the basement ridge is supposed to be is actually low. Furthermore, some of the structures previously mapped are complicated by faulting which occurs at depth but is not recognizable at the surface. They recommend that further work be done in the area.

At this point the chief geologist looks over all the reports again and finally decides that the first structure mapped might be just as good as any of the others. So he refers the subject to the land department for leasing.

Land Men, Lawyers, Tax Experts

The lease man contacts the land owner. The land owner calls in his lawyer. The lawyer requests a tax expert. The tax expert, anticipating inheritance taxes, decides he needs a valuation engineer to estimate the amount and value of the oil and gas that may be under the land. The valuation engineer finds he needs an expert gas man to aid in figuring the gas reserves, a petroleum engineer to help in figuring reservoir pressures, and an expert in unitization procedure to determine the percentage likely to be realized under unit operation.

A title man is called in to pass on the title, and an expert on rights-of-way to interpret some obscure clauses regarding trespass.

Finally the lease is completed and sent through the usual channels to be documented.

Then the vice president in charge of field operations comes back to our executive committee for an appropriation to drill. By this time, naturally, the executive committee is several years older and has forgotten most of the details of the deal. But after wading through several pounds of reports it appropriates the money.

Well-Location Trouble

The vice president in charge of field operations calls in the chief geologist and tells him to make the location. The chief geologist calls a consultation of his various specialists and they spread out their maps and begin to discuss the location of the well.

The field geologist, naturally, wants to drill on top of the structure he mapped. The paleontologist wants to move the location 100 ft. to the east because of facies changes.

The geophysicist wants to move it 200 ft. north because of velocity gradients.

The land man thinks it should be 100 ft. south because of the offset clause in the lease.

The lawyer drops in and thinks it ought to be moved farther west to insure a more suitable position for unitization.

The Vice President's Decision

At this point the vice president happens to come by, takes a look, stabs his finger at the map and says, "Nuts—let's drill here."

So the surveyor is called in and told to drive a stake at the chosen location.

A few days later, the manager of operations, drilling superintendent, division petroleum engineer, drilling contract supervisor, and mud engineer drive out to the location to make the necessary layout on the ground.

Things proceed with just about the normal amount of confusion for a day or two and then the lease supervisor suddenly reminds everyone that the lease carries an obligation to spud within 1 week.

This throws the whole department into a tailspin but after a week of overtime the well is spudded.

In the meantime the petroleum engineer on the job has been setting up his drilling program including a design for the casing to be run in the well.

But when he delivers it neatly typed, blueprinted, and packaged, the purchasing agent informs him that those pipe sizes are unavailable. So the design is thrown out and the tool pusher figures out how to run the various sizes and grades of pipe that are available.

Additional Experts Enter

The geologists have also been busy formulating a coring program. But when they turn this in, the manager of operations trims the daylights out of it because the costs involved are too high.

Consequently, as the well goes down, the cores which are taken don't give enough information to satisfy the core-analysis expert, so he recommends that an electric log be taken. An electric-log analysis expert is called in and for a short time everyone seems relatively satisfied with the operations.

This doesn't last long, however, because the next core analysis convinces the core-analysis expert that the wrong kind of drilling mud is being used and that possible productive sands are being damaged. He recommends that the mud engineer be called in again.

The mud engineer fusses around with a pinch of this and a shovelful of that until he has worked out a new formula and they start drilling again.

Next time they run an electric log, however, they find that the new mud is not conducive to procuring electric logs. Furthermore, the sand analysis indicates that the well should be productive, but the electric log indicates the contrary.

Everything is halted once more and a gamma-ray log is run. This fails to settle the argument, so they run a neutron log. The neutron-log specialist's only contribution is to question the wisdom of ever drilling the well in the first place.

So after the room full of specialists have argued back and forth for 2 or 3 days, someone makes the brilliant suggestion that they drill the well deeper. When this decision is passed on down to the tool pusher, he gives his crew a four-letter word lecture on the value of higher education and points out that he made this suggestion several days ago.

Shortly after this a good sand is encountered and everyone begins to say "I told you so." But the reserves expert cools them all off by discovering the sand is only 2 ft. thick.

More Conferences Needed

The well is pushed on down and encounters hundreds and hundreds of feet of shale which finally turns to gray sand. Another conference of the experts is held.

The tool pusher says the sand is wet. The electric log is negative. The sand analysis indicates possible gas production.

After listening to everyone's opinions, the vice president calls his wife. She consults here astrology charts and tells him to run the pipe.

By this time, however, the string isn't long enough to reach the bottom of the hole, so the purchasing agent has to get the president to call a friend of his in the steel business to put some pressure on a pipe outfit to get additional pipe.

The research experts inform the engineers that certain specifications regarding the slots for the liner should be followed. But by the time the pipe is procured there's no time for this and the well is gun perforated.

The well won't flow so the production engineer and the mechanical engineer go into another conference to decide what kind of artificial-lift devices they ought to use. The process engineers design gas-separation equipment, gas lines, and gas-treating facilities.

When all this is done and the equipment is installed, we find that we've enlisted the help of 35 different specialists on the project to get a well that will produce 35 bbl. per day of 35°-gravity crude.

Russian Oil Industry Exceeds 1948 Quota by 8 Per Cent

WASHINGTON. — The Russian oil industry hit its production target last year but failed to reach the speed of exploratory drilling stipulated in the 1948 chapter of the Soviets' 5-year plan, according to a review by the Council of Ministers released here last week by the Russian Embassy.

The oil industry as a whole topped its quota by 8 per cent, producing 13 per cent more oil, 12 per cent more gasoline, and 17 per cent more kerosine than in 1947. Natural-gas production showed an increase of 10 per cent over the preceding year. The rate of drilling oil wells increased 28 per cent in comparison with 1940.

As usual, that part of the production reports released to the public provided no basis from which to estimate the volume of output. All figures are given in percentages without any indication of the base on which they are calculated.

The machinery by which the industrial activity of Russia is planned years in advance is outlined in the current issue of the U.S.S.R. Information Bulletin.

Supreme Soviet Shapes Planning

The general direction of planning is shaped by the Supreme Soviet, the highest state authority in the country, put into shape by the Council of Ministers, the highest executive and administrative state body, and turned over to the State Planning Committee (Gosplan) for administration.

"Gosplan coordinates the development of the separate branches of production and capital construction," the bulletin explained; "it guarantees the availability of the materials necessary for the realization of the plan; and it plans for the progress of science and engineering in conformity with its analysis of the outlook for the country's progress as a whole. It checks on the fulfillment of the state economic plans and directs the work of socialist accounting throughout, and, also in the field of plan fulfillment, it directs the activities of the Central Statistical Administration, which operates under the Council of Ministers of the U.S.S.R."

Planning Agencies

There also are planning agencies in the various ministries and departments and in each of the republics which comprise the Soviet Union. The former deal with the activities of individual industries, the latter with those of the various regions of the country.

As the planning filters down, it becomes more and more detailed, finally winding up in the preparation of a program by each individual industrial establishment showing the industrial program of output; schedules for the work of the various departments; technical standards for the utilization of equipment, raw materials, fuel, supplies, and electric power; launching of new types of output; organization of labor; materials needed to fulfill the plan; estimates of production expenditures and calculations of costs; financial plan and, lastly, a plan for the disposal of finished output.

Having reached the bottom the planning again moves, this time upward for review and consolidation, and finally is laid before the Supreme Soviet as a definite program for approval.

Top Price Paid for Alberta Leases in Redwater Field

The Alberta Government added $5,198,071 to its 1949 revenues when it accepted the highest cash bonuses ever offered in Canada for leases of Crown oil and gas rights. The bids were for 1,278 acres of government oil rights, proven and semiproven, in Redwater field discovered 5 months ago by Imperial Oil, Ltd.

Royalite Oil Co. bid $3,153,491, or $4,927.30 per acre, for Section 15, lying between Imperial 1 and 3 Redwater oil wells, which are 4½ miles apart. British American Oil Co., Ltd., and Hudson's Bay Oil & Gas Co., a team which started a Redwater partnership last December, bid $2,044,580 for Section 30, cash bonus being $3,204.70 per acre. The lease is in the midwest section of Redwater field, beginning a mile southwest of Imperial 1. In addition to cash, the government will collect normal production royalty, currently 12½ per cent of gross yield.

Sour-Crude Symposium To Highlight Meeting

The effects of sour crude oil and methods of combating them will provide the theme of a 2-day symposium March 30-31 to be held in connection with the 115th national meeting of the American Chemical Society in San Francisco.

DR. A. A. O'KELLY

A total of 29 technical papers on the subject will be presented by leading United States and Great Britain chemists, according to Dr. Wayne E. Kuhn, manager of the technical and research division of The Texas Co., New York, and chairman of the society's Division of Petroleum Chemistry.

Dr. Arlie A. O'Kelly, associate director of the research and development department of Socony-Vacuum Oil Co., Inc., will preside at the symposium.

A high-polymer forum will be a feature of the meetings of the Petroleum Division. Dr. William J. Sparks, director of the chemical division of Standard Oil Development Co., Elizabeth, N. J., will serve as forum chairman.

Next Week

Cleaning heat exchangers.—Two Phillips Petroleum Co. experts give discussion of methods and thoroughgoing know-how on this important gasoline plant-refinery et al, maintenance subject.

Estimation of gas reserves.—Three engineers from Magnolia Petroleum's Dallas research laboratories discuss application of compressibility factors in calculations.

Framing bids for drilling contracts.—A one-page form or "check chart" lists all applicable items.

Geophysical reflections.—Can these data be correlated with geological horizons? Vice president of Century Geophysical Corp. presents viewpoints and data.

Pressure maintenance in Arkansas.—The Journal's District Editor Dave Stormont presents reservoir studies and data for seven important fields.

"Reservoir Engineering," by Dr. Morris Muskat.—No. 3 Summarization Statement on "Gas Drive Performance."

Cycling a three-well field.—The Journal's Gulf Coast editor describes Western Natural Gas Co.'s equipment setup in Goebel field, Live Oak County, Texas.

Ground water supplies.—Test methods for wells and maintenance of screens are discussed in second article.

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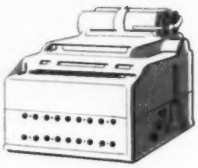

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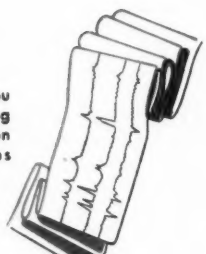

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PERSONALS

Brown Is Head of New Lone Star Department

NAMED head of the new exploration and gas-supply department, Lone Star Gas Co., Dallas, is E. A. Brown, former superintendent of production for Lone Star Gas and Lone Star Producing companies. The new department will coordinate operations of the land, geological, and production departments, and was deemed necessary due to the company's greatly-expanded drilling program. All three departments will be under the general direction of Brown.

Brown has been with Lone Star Gas since 1932, starting as a clerk in the production - engineering department. He previously was an estimator, and engineer for Mosher Steel & Machinery Co., Dallas. He served with Lone Star as office-production engineer, assistant chief-production engineer, and chief-production engineer. He was named superintendent of production in February 1947.

The new department manager graduated from Texas A. & M. College in 1924.

In conjunction with the elevation of **E. A. Brown,** Dallas, to manager of the newly formed exploration and gas supply department for Lone Star Gas Co., the following men have been promoted to fill positions within the department: **J. Paul Rogers,** former assistant field supervisor, has been named exploration engineer of the department; **Carl M. Hill,** formerly chief production engineer, has been advanced to superintendent of production; **W. F. Burke,** formerly assistant chief production engineer, has been made chief production engineer; and **M. O. Attebery,** field supervisor of production, is now assistant chief production engineer.

J. P. ROGERS

C. M. HILL

Rogers joined Lone Star Gas in August 1933 in the pipe-line department. Hill went with the company in 1930; Attebery began work with the firm in 1933; and Burke joined the company in 1940.

W. F. BURKE

M. O. ATTEBERY

Herbert M. Cooley, Bethlehem Steel Co., Tulsa, has been nominated for chairman for 1949 of the Mid-Continent section, American Institution of Mining and Metallurgical Engineers.

C. C. Lister, United Geophysical Co., has been appointed manager of foreign operations for the company, and will be temporarily headquartered in Caracas, Venezuela, where he now resides, and at a later date will transfer to headquarters in Pasadena, Calif.

Emmett J. Barker, process engineer, has joined Phillips Petroleum Co.'s staff in Oklahoma City.

J. C. Byrd, Oklahoma University geology graduate, has joined the staff of Root Petroleum Co., at Shreveport, La.

Ed B. Launius has been named to the geological staff of British American Oil Producing Co., Shreveport, La., succeeding **R. B. Sullivan,** who resigned to join Sunray Oil Corp. there.

Henry Winters has been promoted from general superintendent to vice president of Southern Minerals Corp., Corpus Christi, succeeding **James Doughty,** who resigned to enter the drilling contracting business.

George H. Barnes, production foreman, Shell Oil Co., Inc., Kilgore, Tex., has been promoted to district foreman at Kilgore. He has been with the company 25 years, starting as a stenographer clerk in the Tulsa office.

Tilford H. Bean, formerly consulting engineer, Dallas, has been appointed manager of manufacturing for Stanton Chemicals, Inc., and will be in charge of the company's new plant now nearing completion at Corpus Christi. The new manager's duties will consist principally of coordinating the various processes involved in the manufacture of aromatic-type hydrocarbon solvents, phthalic anhydride, anthraquinone, organic acids and a variety of petroleum specialties.

Bean has held responsible positions in the engineering and chemical-processing fields with a number of major companies, including Dow Chemical Co., Rubber Reserve Corp., and Blaw-Knox Co. For several years he was associated with Firestone Tire & Rubber Co., in the capacity of chief engineer at their synthetic rubber development at Port Neches, Tex.

Tiner A. Lapsley, Rainbow Service Co., has been moved to Lindsay, Okla., from Oklahoma City, to establish headquarters for a paraffin cleaning unit for the company.

Richard T. Chapman, district geologist, Stanolind Oil & Gas Co., Shreveport, La., has been named senior geologist, Oklahoma City division. He will be succeeded in Shreveport by **Frank M. Osmont.**

John A. Sharp, veteran of 33 years' service with Esso Standard Oil Co., has been promoted to foreman in the package department of the company's Bayonne, N. J., refinery, succeeding **Patrick J. Canavan,** who retired recently.

Robert P. Richmond, engineer, technical department, Baltimore refinery, Esso Standard Oil Co., has been made technical assistant to the general foreman of the crude distil-

PERSONALS

lation division. **Thomas F. Doyle,** shift foreman and chief operator, has been named general shift foreman.

L. J. Slentz, Kilgore, Tex., and **Charles T. Slack,** Taylor, Tex., have been named new engineers for the Midland, Tex., district office, Texas Railroad Commission.

Jesse K. Crownover, assistant secretary of Gulf Oil Corp., Pittsburgh, Pa., has retired after 41 years' service.

J. M. Schlagel, Kansas City, Mo., has been appointed Iowa representative for Bell Oil & Gas Co., with headquarters in Des Moines.

Ballard M. Burgher, Midland, Tex., has joined Texas Railroad Commission as petroleum engineer. He is a recent graduate of Texas University.

E. D. Brockett, Jr., assistant superintendent of production, Gulf Oil Corp., Fort Worth, Tex., has been promoted and transferred to the company's general headquarters in Pittsburgh, Pa. His new assignment is assistant to the vice president in charge of production and pipe lines. Brockett received his degree in petroleum engineering from Texas A. & M. College in 1934, and joined Gulf the same year as a roustabout in West Texas fields.

Dr. Sherman A. Wengerd, associate professor of geology, University of New Mexico, Albuquerque, will be the recipient of the President's Award of the American Association of Petroleum Geologists at the association's thirty-fourth annual meeting, to be held in St. Louis, March 14-17.

DR. S. A. WENGERD

G. C. GESTER

F. M. VAN TUYL

The President's Award is given to the author, under 35 years of age, of the best geological paper published in the A.A.P.G. Bulletin during the year. Dr. Wengerd wins the award with his paper on "Fernvale and Viola Limestones of South-Central Oklahoma" which appeared in the December 1948 issue of the association bulletin. A native of Millersburg, Ohio, Dr. Wengerd received his A.B. degree in geology in 1936 from Wooster College, Wooster, Ohio. He has held various teaching positions, and has been with University of New Mexico since 1947. He did special work for the U. S. Navy during the war.

Another highlight of the A.A.P.G. annual meeting will be the awarding of honorary memberships in the association to **George C. Gester,** consulting geologist, Standard Oil Co. of California, and **Francis M. Van Tuyl,** head of the geological department, Colorado School of Mines, Golden. They will receive honorary memberships in recognition of distinguished service in petroleum geology. Gester is a native of Buffalo, and received his B.S. degree in 1908 from University of California. He joined Standard of California in 1917. Dr. Van Tuyl has been head of the geological department of Colorado School of Mines for 30 years.

L. G. (Babe) Cameron, consulting geologist, has joined **Durbin Bond,** Little Rock, Ark., and will be in charge of geological operation in Arkansas, Louisiana, Texas, and Mississippi. He will be headquartered in the Giddens-Lane Building, Shreveport, La.

Officials of the producing department, The Texas Co., gathered in New York for the annual producing committee meeting the week of February 7, and mapped the operating program for the year. In the group seated around the table from left to right are: R. Ogarrio, vice president in charge of producing and chairman of the committee; E. R. Filley, Houston, manager of producing department; A. R. Wilson, Houston, assistant manager of producing department; R. L. Keyes, New Orleans, manager of Louisiana division; J. N. Troxell, Houston, assistant manager-departmental geologist of producing department; J. W. Foley, New York, assistant to vice president, producing department; E. H. Hunt, Calgary, Alta., Canada, manager Texaco Exploration Co.; J. C. Brooks, Houston, department agent of producing department; G. Herzog, Houston, director of research, producing department; C. B. Williams, Fort Worth, manager West Texas division; E. P. Hayes, Houston, chief petroleum engineer; W. J. Hanley, New York office, producing department

In the right side on the picture, seated in the row next to the table, from top to bottom, are: A. C. Hunter, New York, assistant to general manager of the producing department, and secretary of the producing committee; L. A. Scholl, Jr., Houston, manager geophysical division; H. H. Arnold, Jr., Denver, manager Rocky Mountain division; W. V. Vietti, Houston, manager gas division; J. T. Wood, Jr., Los Angeles, manager Pacific Coast division; (and from top to bottom in the outside row) Herman Brunjes, New York office, producing department; W. C. Kneale, Houston, manager South Texas division; W. H. Farrand, New York, general manager foreign producing department; M. J. Heald, Tulsa, manager Oklahoma division; V. L. Porter, Houston, assistant to manager. R. F. Baker, general manager of the producing department and vice chairman of the producing committee, was not present when the photograph was made

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1—Ejector case, salt system, treating, single element, 2 stage.
2—Ejector cases, salt sampling, single element, 2 stage.

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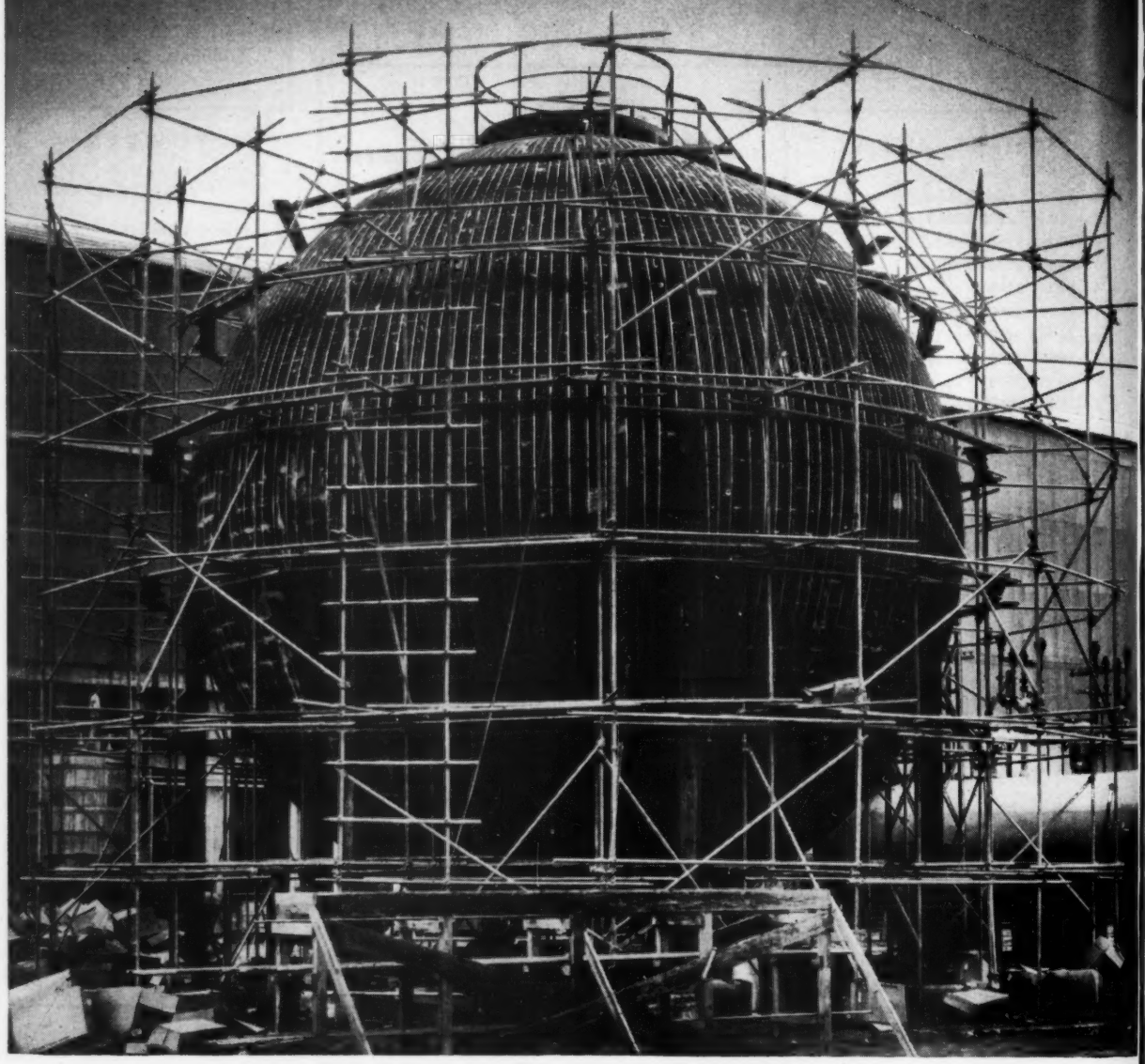

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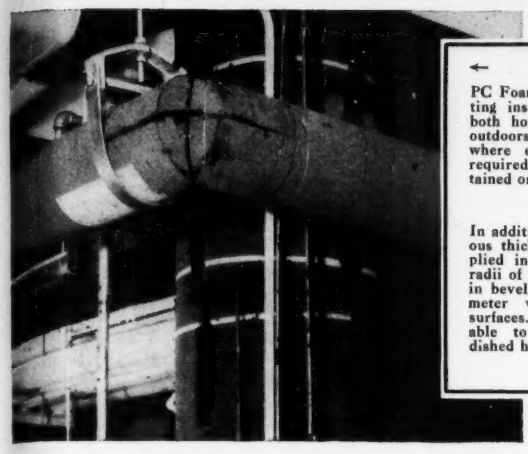

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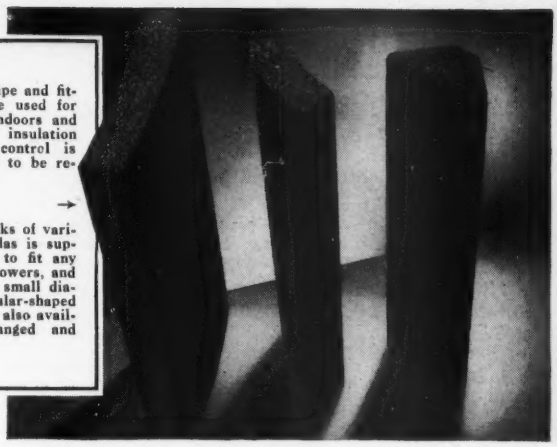
PC Foamglas is the only pipe and fitting insulation that can be used for both hot and cold lines—indoors and outdoors. It's the ideal insulation where exact temperature control is required; wherever heat is to be retained or excluded.

→

In addition to standard blocks of various thicknesses, PC Foamglas is supplied in preformed shapes to fit any radii of circular tanks and towers, and in bevelled lags for domes, small diameter vessels and irregular-shaped surfaces. Shaped material is also available to fit spherical, flanged and dished heads.



PC FOAMGLAS . . . for hot and cold applications . . . for indoor and outdoor use

IT'S WEATHERPROOF, FIREPROOF, WATERPROOF, VAPORPROOF

● On process equipment and piping, PC Foamglas withstands humidity; helps maintain desired temperature levels; aids in minimizing condensation. And, since PC Foamglas is a true glass . . . not a fiber, wool, board or batt . . . it is waterproof, fireproof and verminproof—proof against the elements that cause other materials to deteriorate. It's a fact that when PC Foamglas is installed according to our specifications for recommended applications, it retains its original insulating efficiency *permanently*.

PC Foamglas requires no protective covering, either. There aren't the costly repairs, replacements and maintenance involved in other insulating materials.

What's equally important, PC Foamglas is light weight; easy to handle. It can readily be cut with a knife in straight lines or odd shapes. And because it's friable, when subjected to point loading, it yields to such surface irregularities as rivet heads and welds. Thus it can be pressed close to the area to be insulated without breaking or cracking; it can be shaped to curved surfaces of all radii.

Remember, first cost is last cost when you insulate tanks, towers, heat exchangers and other processing equipment with permanent PC Foamglas. But why not get full and up-to-date information? Fill in and return the coupon for our free booklet. There's no obligation.

This is FOAMGLAS

The entire strong, rigid block is composed of millions of sealed glass bubbles. They form a continuous structure, so no air, water, vapor or fumes can get into or through the Foamglas block. In those closed glass cells, which contain inert air, lies the secret of the material's permanent insulating efficiency.

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS

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Without obligation on my part, please send me your FREE booklet on PC Foamglas Insulation, the *permanent* industrial insulation.

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When you insulate with Foamglas ...you insulate for good!

PERSONALS

L. E. Gray, Jr., former petroleum engineer, Midland, Tex., district, Texas Railroad Commission, has joined **Earl W. Jones,** consulting petroleum engineer, in Abilene, Tex.

Edward R. Kennedy, Jr., Sentinel Butte, N. D., has joined Argo Oil Corp., Midland, Tex., as a geologist. He is a recent graduate of University of Texas.

J. H. Johnson, veteran of 23 years' service with Continental Oil Co., Ponca City, Okla., will retire as director of the company's insurance division on March 1, and will be succeeded by **G. G. Mason,** who has been with the firm since 1926.

Tom Frick, division production superintendent, Atlantic Refining Co., has been elected president of the Permian basin section, American Institute of Mining and Metallurgical Engineers, for 1949. Other officers are: **W. N. (Bill) Little,** district engineer, Tide Water Associated Oil Co., vice president, and **Jack M. Moore,** district engineer, Dowell Incorporated, treasurer.

Ralph E. Schneider, petroleum engineer and geologist, St. Louis, Mo., has moved to Roswell, N. M., from St. Louis, where he will manage two companies, The 36 Co. and Vikar Co.

W. E. Owen, Midland, Tex., has been named chief exploration engineer for Shell Oil Co., Inc. Owen formerly was division production manager for the company at Lake Charles, La. He has been with Shell since 1935.

James Lework, Carter Oil Co. geologist at Fort Smith, Ark., has been transferred to the company's Oklahoma City division offices.

Gordon Drilling Co., rotary-drilling affiliate of Gordon Oil Co., has been purchased by **Herbert L. Moravy, L. Eddie Gault,** and **S. L. Curtiss,** who become president, vice president and secretary-treasurer, respectively, under the new ownership. Sale involved stock, three rotary rigs and other company assets.

Dr. Francis M. Archibald, Esso Standard Oil Co., has been named head of all laboratories at the company's Bayway, N. J., refinery, replacing **Matthew D. Mann, Jr.,** who is scheduled for retirement April 1. The position is a newly-created post, Mann having coordinated activities of Bayway laboratories from his position in the managers office. **Clifford E. Gustafson** has been promoted head of the chemical product laboratory succeeding Dr. Archibald. A native of Canada, Dr. Archibald has been with Esso Standard since 1928. Gustafson, who graduated from University of Wisconsin in 1927, went with the company that same year as a student engineer.

Dr. Eugene Callaghan, noted economic geologist, has been appointed director of the New Mexico bureau of mines and mineral resources division of the New Mexico School of Mines at Socorro, N. M. He will assume duties as director of the bureau in September 1949. **E. C. Anderson,** acting director of the bureau, will take charge of the mining department of the bureau, devoting full time to development of the department.

SHIFTS—

P. M. Huemmer, engineer, Ehrhart & Arthur, Inc., Oakland to San Francisco; **J. R. Evans,** engineer, Creole Petroleum Co., Big Springs to Houston; **E. G. Hays,** engineer, Humble Oil & Refining Co., Houston to Genoa, Tex.; **George William West,** engineer, Sinclair Prairie Oil Co., Midland to Anna, Tex.

H. L. Patterson, superintendent, Pure Oil Co., Clay City, Ill., to Casper, Wyo.; **J. D. King,** superintendent, Pure Oil Co., West Liberty to Clay City, Ill.; **Younger Neal,** engineer, Pure Oil Co., Mt. Pleasant, Mich., to Newark, Ohio; **M. T. Farrell,** engineer, Gulf Refining Co., Baxterville, Miss., to Shreveport, La.; **Joseph R. Ault,** engineer, Carter Oil Co., Port Gibson to Brandon, Miss.; **J. F. O'Shaughnessy,** Lario Oil & Gas Co., Wichita, Kans., to Miami Beach, Fla.; **Keith J. Ebner,** engineer, The Texas Co., Calpit, Wyo., to Houma, La.; **L. W. Folson,** geologist, California Co., Laramie, Wyo., to Lexington, Ky.; **James C. Burtner,** engineer, Phillips Petroleum Co., Pampa, Tex., to Texhoma, Okla.; **Millard R. Wilson,** engineer, The Texas Co., Marlow, Okla., to Tulsa.

Grady Van Hooser, superintendent, American Oil Service, Compton to Bellflower, Calif.; **C. C. Stephens,** foreman, West Texas Gas Co., Tahoka to Plainview, Tex.; **L. J. Meyer,** engineer, Railroad Commission, Austin to Houston; **James N. Reeves,** geologist, Pan American Production Co., Austin, Tex., to Shreveport, La.; **J. L. Elkin, Jr.,** geologist, Humble Oil & Refining Co., Hebbronville to Dallas, Tex.; **John S. Wold,** geologist, Barnsdall Oil Co., Houston to Casper, Wyo.; **Bruce Echo Hawk,** foreman, Century Geophysical Corp., Kermit to Olney, Tex.; **Thomas U. McElmurry,** engineer, Stanolind Oil & Gas Co., Pasadina, Tex., to Batesville, Ark.; **J. M. Kilborn,** foreman, Gulf Oil Corp., San Angelo to El Paso, Tex.

J. M. Milam, foreman, Phillips Petroleum Co., Sunray to Holliday, Tex.; **D. B. Rumsey,** foreman, C. H. Murphy & Co., Cotton Valley, La., to El Dorado, Ark.; **Edwin R. Pace,** chemist, Sun Oil Co., Delhi, La., to Delmita, Tex.; **H. L. Lawler,** engineer, Stanolind Oil & Gas Co., Vivian, La., to Powell, Wyo.; **Irvin B. Murray,** geologist, The California Co., De Witt, Ark., to Waynesboro, Miss.; **John A. VanAuken,** engineer, Marine Exploration Co., De Witt, Ark., to Waynesboro, Miss.; **L. Decker Dawson,** foreman, Republic Exploration Co., Guthrie, to Holdenville, Okla.; **R. V. Mertz,** engineer, Stanolind Oil & Gas Co., Tulsa to Denver, Colo.; **Nolan M. Goodwin,** field gas man, The California Co., Lake St. John, La., to Rangely, Colo.

DEATHS

G. Harrison Smith, 69, formerly president of Imperial Oil Co., Ltd., died February 17 in Florida. He retired in 1945 from active business interests. Smith began his career in the oil business in 1898. He became vice president of West Indies Oil Co. and Standard Oil Co. of Brazil in 1911. He was named chairman of the board of Imperial Oil in 1944.

Lawrence G. Stelzle, president of Walter Motor Truck Co., New York, died February 12.

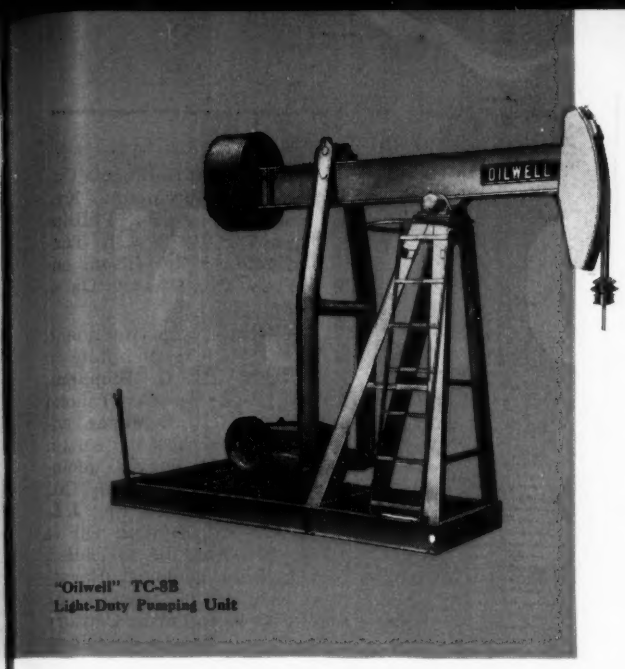
Percy D. Daniels, veteran of 31 years in the refining department, Esso Standard Oil Co., Baton Rouge, La., died February 4 in Baton Rouge.

Dr. Bailey Willis, 91, internationally known seismologist and geologist, died February 19 at Palo Alto, Calif.

Paul L. Newcomb, 66, Long Beach, Calif., independent oil producer and formerly with the export division of Oil Well Supply Co., New York, died recently in Long Beach.

Henry H. Tschappat, 54, assistant Michigan district manager, National Supply Co., died February 15 in Mount Pleasant, Mich.

Herbert O. Sanford, 65, Franklin, Pa., independent oil operator, died February 18 in Franklin.



"Oilwell" TC-8B
Light-Duty Pumping Unit

FROM the smallest, shallow-well pumping unit to large models for heavy-duty production assignments, "Oilwell" Pumping Units are scientifically designed to give trouble-free performance, long life and economical service.

Advantages of "OILWELL" Pumping Units

Easy and effective counter-balancing—"Oilwell" Type "B" adjustable counterweight cranks are standard equipment on all heavy-duty units and the TC-17C medium-duty unit. All other medium-duty units have slab-type counterweight cranks and are also equipped for beam counter-balancing. The light-duty units are counter-balanced by means of beam weights. It is necessary to purchase only enough counterweights to suit individual well conditions.

Wide speed range — Inherent stability, ample strength throughout, and accurate counter-balancing make it possible to operate "Oilwell" pumping units safely over a wide speed range.

Wide selection of stroke lengths — "Oilwell's" self-aligning crank-pin bearings and knuckle-joint pitmans facilitate adjusting stroke lengths in the field.

Adaptable to temporary or permanent foundations — The strength and rigidity of "Oilwell" pumping units make them adaptable to temporary wood foundations or permanent foundations which require a minimum of concrete.

Portable—Deep structural-steel base beams facilitate field-transportation and installation. The wide base construction minimizes the tendency to turn over when loading or unloading.

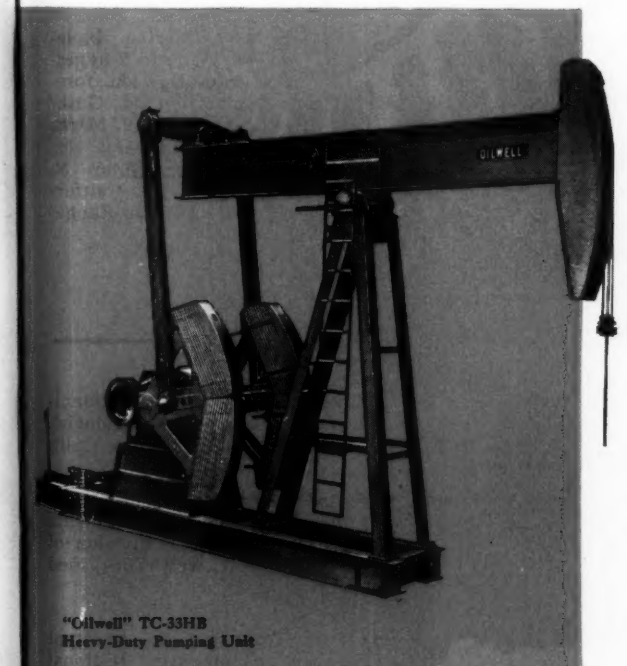
Adaptable to a variety of prime movers—Universal slide rails make it easy to install various types, makes and sizes of prime movers. The fly-wheel-type pulley smooths out torque peaks and prevents excessive load fluctuations.

For True Operating Economy

select the "Oilwell" Pumping Unit that is designed to meet your well requirements

Long life and low upkeep . . . result from numerous outstanding construction features, including a lubrication system that makes maintenance foolproof and easy. From only three locations a maintenance man with a grease gun can grease pack every bearing quickly.

Wide range of sizes and types — The wide selection of "Oilwell" Pumping Units is made possible by the interchangeability of gear boxes and other major parts. This provides maximum economy for a great variety of pumping requirements.



"Oilwell" TC-33HB
Heavy-Duty Pumping Unit

Unit	Polished-Rod Load Capacity A.P.I. Rating pounds	Peak-Torque Capacity at 20 s.p.w. A.G.M.A. inch-pounds
Light-Duty Twin Crank		
TC-5C	5,100	24,100
TC-6	6,900	32,200
TC-8B	9,500	45,400
Medium-Duty Twin Crank		
TC-12C	10,000	60,500
TC-17C	12,800	85,600
Heavy-Duty Twin Crank		
TC-23	17,400	120,600
TC-28	17,400	145,700
TC-33HB	21,000	166,700

The "Oilwell" line is supplemented by a wide selection of surface equipment and production supplies.

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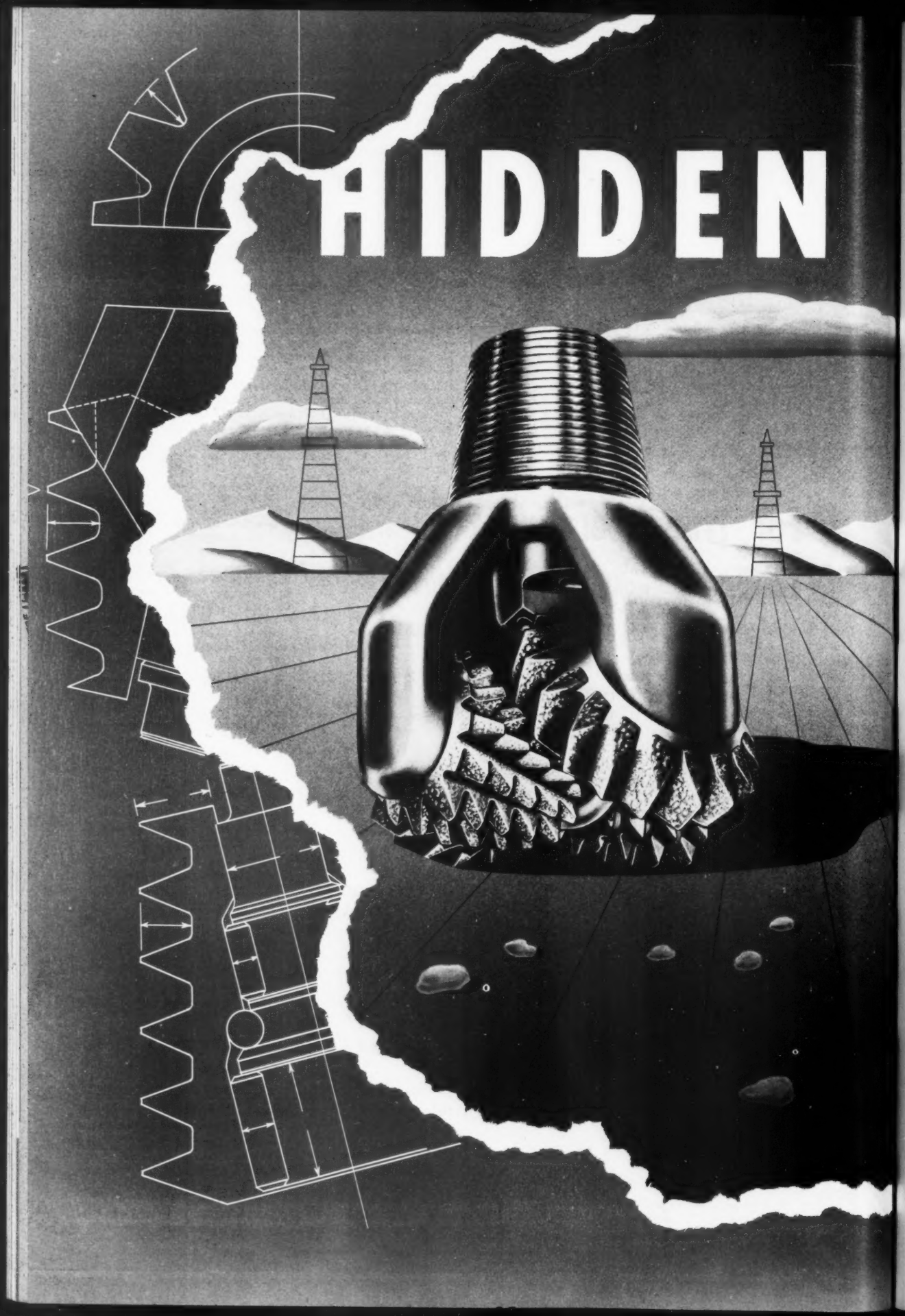
USS "OILWELL"

UNITED STATES STEEL



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QUALITY...

...a most important reason why

REED ROCK BITS

are preferred for

STRAIGHTER HOLE WITH SAFETY

It is easy to see the rugged design, the carefully placed hard facing, the strong cross bracing and the scientifically correct tooth designs. These features are visible assurance that Reed Rock Bits will do a good job for you.

But the hidden qualities . . . the heavy long-life bearings that hold the cutters in place . . . the amazing combination of hardness and toughness that Reed's advanced heat treating gives to expensive alloy steels . . . the many fine points of Reed design . . . these hidden features of Reed Rock Bits are the real reasons leading operators everywhere prefer Reed Bits for straighter hole with safety.

Reed ROLLER BIT COMPANY

HOUSTON 1, TEXAS

BE SAFE WITH REED

NEW YORK BUENOS AIRES LONDON

TOUR OF A TURNAROUND

AT SHELL OIL CO.'S 25,000-BBL. PER DAY CATALYTIC CRACKING PLANT AT HOUSTON

TO shut down, then thoroughly clean, inspect, and repair a 25,000-bbl.-per-day fluid catalytic cracker, at best, is a complicated operation. Careful preplanning and precise execution can result both in very substantial dollar savings for the job itself, and longer and more efficient future operating runs.

Latest turnaround of Shell Oil Co., Inc.'s Houston refinery cat cracker was preplanned for a 26-day total downtime period. This was accomplished exactly to the day, counting from the time the shutdown started until the unit was back on stream. Actually from the day the unit began to "come down" until the maintenance work proper was completed was only 22 days; balance was "starting up."

The Shell key men involved in the company's cat cracker operation began a series of discussions and conferences 6 months before actual workover operation started. The over-all procedure was detailed completely so that each man's work could be scheduled for every day through the work period.

The actual turnaround project involved some 300 craftsmen, including carpenters, brick layers, welders, electricians, pipe fitters, machinists, riggers, boiler makers, and painters. The schedule, together with flow of supplies and tools, followed a logistical course as carefully planned as that of a military operation. Beforehand, temporary platforms were built and scaffolding erected around the reactor, regenerator, and other major vessels. Welding equipment was readied. Portable lighting equipment was installed to illuminate interiors of large vessels and tanks. Portable tool room was set up, together with a loud-speaker communication system.

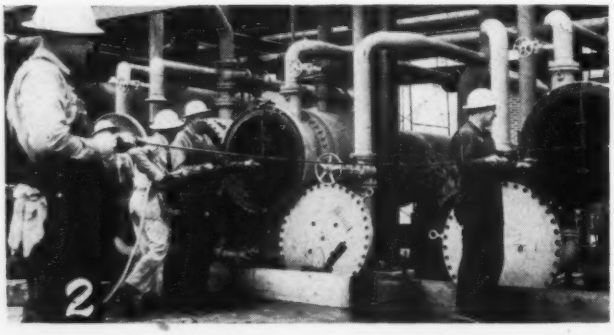
When the turnaround was ready to commence, the cat cracker unit was brought down by gradually reducing the feed to zero; the vessels and tubes began to cool. Steam was then run through the unit to remove gases.

Special emphasis was laid on safety. Tubes, piping, and vessels were tested for gas before welders entered. Streams of fresh air were kept circulating through the large vessels to make breathing easier for the men inside. Masks were used in places where fine catalyst dust was present. Temporary first-aid station was set up in the operations office where most of the treatment consisted of eye washing to remove fine dust and particles. Safety engineers continually checked the procedures.

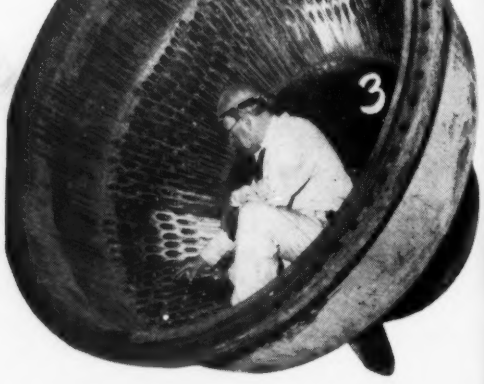
1—Daily conferences and briefing keep operation going at top speed. W. W. Coale (left), assistant manager, catalytic cracking department, talks over the day's work with F. H. McLellan, C. F. Williams, J. W. Schroeder, and J. R. Herrman

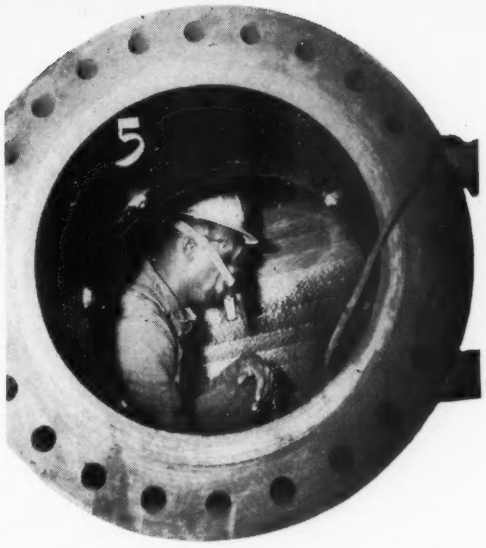
2—Condenser tubes of gas-recovery plant for cat cracker are cleaned with hydrojet drill rods. These spray water under pressure

(Photos courtesy Shell Oil Co., Inc.)



3—Pitted lining in top cover of recycle catalyst cooler is examined by O. R. Felton. Pits were caused by impact of finely divided catalyst





4—Piping must be carefully inspected. This view shows insulation removed from lines prior to examination

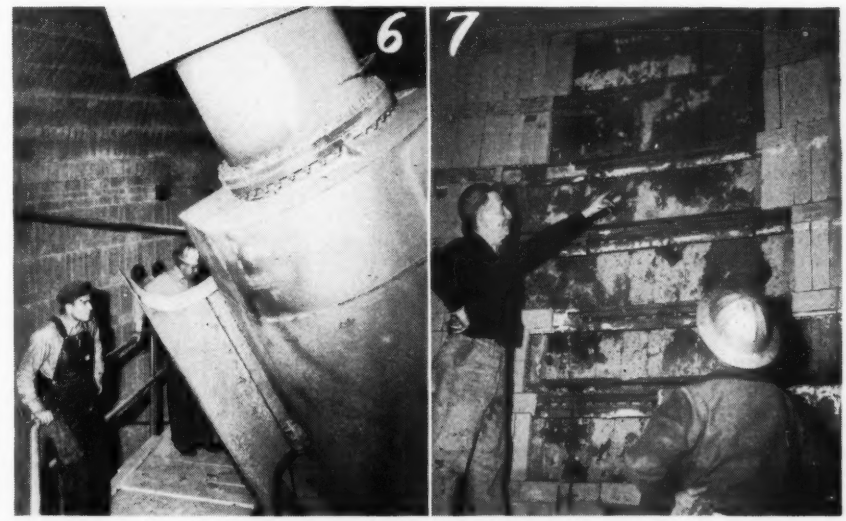
5—Erosion marks caused by catalyst are seen in this view of the internal lining

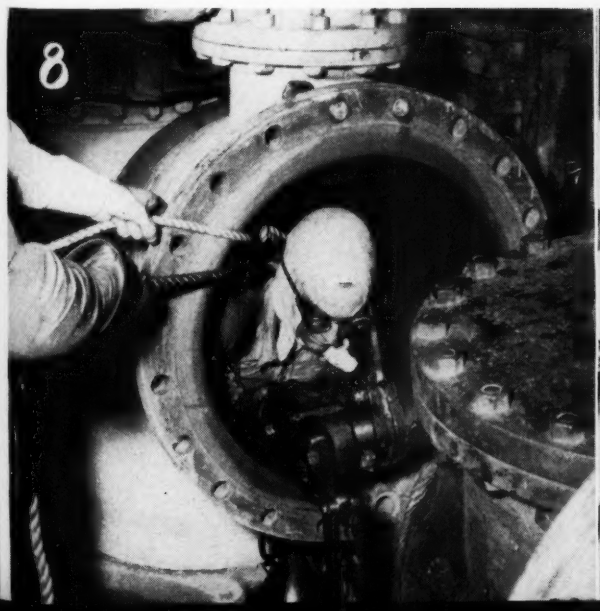
6—Welders preparing to install new metal over eroded surfaces of separation section in the regenerator

7—Refractory lining has been removed to inspect inside steel wall of vessel and refractory suspension sections

8—R. J. Woodward starting on inspection trip through large duct to search for internal erosion and possible lodgment of foreign objects. All safety precautions are being observed

9—Special portable tool and supply room set up near maintenance area. It is equipped with a public address system

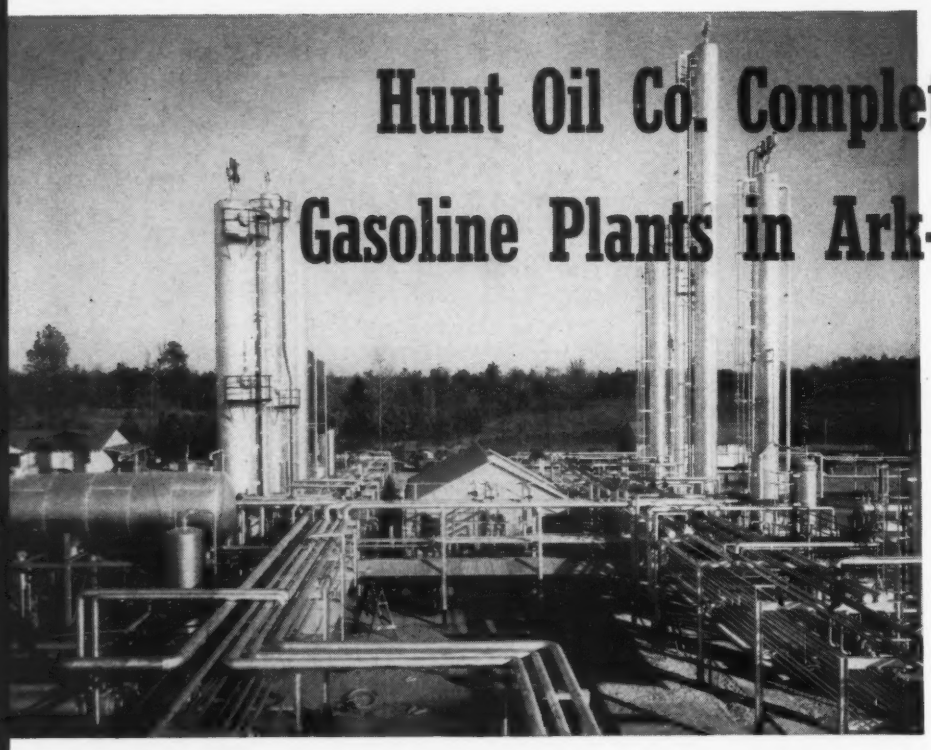




Hunt Oil Co. Completes Two New Gasoline Plants in Ark-La-Tex Area

by

D. H. Stormont



This view shows the general layout and arrangement of overhead piping at the new Lisbon, La., plant

HUNT OIL CO. recently placed in operation two new natural-gasoline plants which are operating at an over-all butane-recovery efficiency of 80 per cent and recovering practically all of the pentanes and heavier from high-pressure gas charged to the plants. Compact in layout, the new plants contain many modern features which make for automatic, efficient operation.

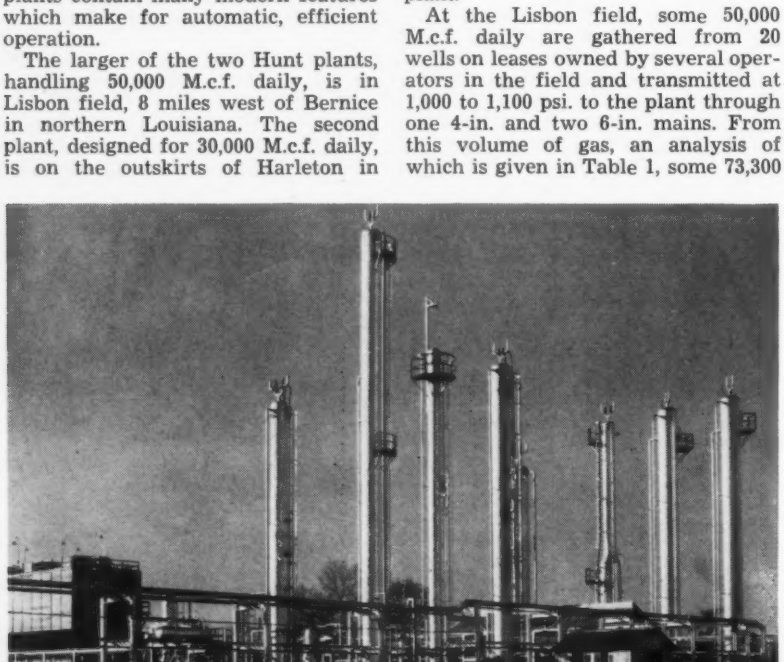
The larger of the two Hunt plants, handling 50,000 M.c.f. daily, is in Lisbon field, 8 miles west of Bernice in northern Louisiana. The second plant, designed for 30,000 M.c.f. daily, is on the outskirts of Harleton in Harrison County, Texas. Aside from the difference in capacities the two plants are quite similar in process equipment, instrumentation, and operation. Both were designed and constructed by Delta Engineering Corp. of Houston. The following discussion, therefore, deals only with the Lisbon plant.

At the Lisbon field, some 50,000 M.c.f. daily are gathered from 20 wells on leases owned by several operators in the field and transmitted at 1,000 to 1,100 psi. to the plant through one 4-in. and two 6-in. mains. From this volume of gas, an analysis of which is given in Table 1, some 73,300 gal. of L.P.G. and finished products are extracted daily. Residue gas, totaling about 46,500 M.c.f., after being dehydrated is sold to gas pipe-line companies.

In extracting the liquid hydrocarbon fractions from the raw gas, a conventional high-pressure absorption system is employed except for a rich-oil contactor built integrally into the lower half of the reabsorber. By means of this process step all of the rich oil, at its lowest pressure level, is brought countercurrently into contact with the net gas from the still. The unstabilized rich-oil stream is thus made to serve as an absorption menstruum, sharply reducing the re-

TABLE 1—ANALYSIS OF LISBON FIELD WET GAS

Lease:	Alford		Bodcaw	
Volume, M.c.f. daily	25,000		25,000	
Pressure, psi.	1,000-1,100		1,000-1,100	
Composition	Mol%	G.p.m.	Mol%	G.p.m.
Carbon dioxide	0.58		1.62	
Nitrogen	1.29		1.11	
Methane	88.39		85.01	
Ethane	5.08		6.37	
Propane	2.01	0.549	2.26	0.618
Isobutane	0.34	0.110	0.46	0.150
Normal butane	0.75	0.236	0.60	0.189
Isopentane	0.33	0.120	0.22	0.081
Normal pentane	0.25	0.090	0.31	0.112
Hexanes	0.44	0.180	0.33	0.135
Heptanes and heavier	0.54	0.420	1.71	0.899
Total	100.00	1.705	100.00	2.184



The columns seen in this view of the Lisbon plant are, left to right foreground: distillate fractionator, debutanizer, deethanizer and depropanizer. In the background are the still contact-reabsorber and the two absorbers

absorption requirements while increasing the average molecular weight and thereby improving condensation of the still overhead vapors.

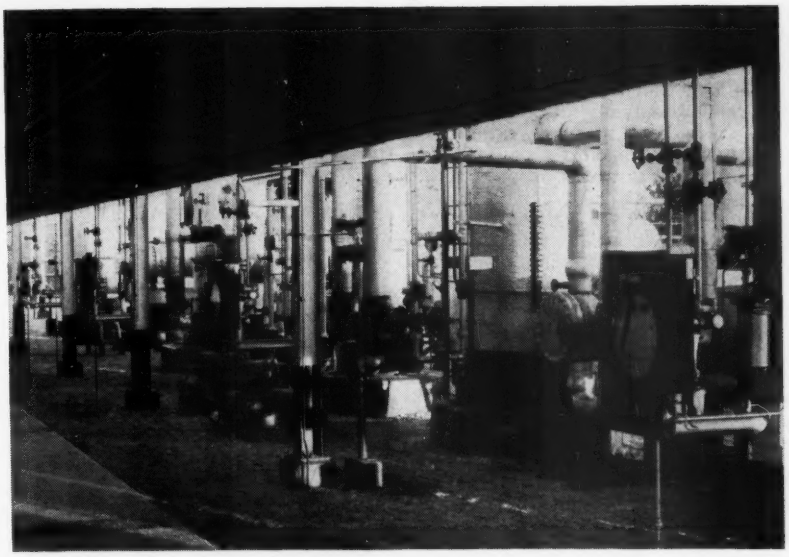
During this contact the vapor stream, by virtue of its relatively low methane content, strips methane from the rich-oil stream by displacing it with heavier constituents. The exchange occurs because the rich-oil stream entering the contactor section is in equilibrium with its own flashed gas. Since this gas is quite lean in comparison with the still gas (64 and 10 per cent methane, respectively), the rich oil is far from saturated with heavier constituents upon coming in contact with the richer gas. Absorption of the heavier constituents thus has to occur. And, since the total pressure of the system is fixed, the lighter constituents (principally methane) are displaced from the liquid phase.

Operation Completely Stable

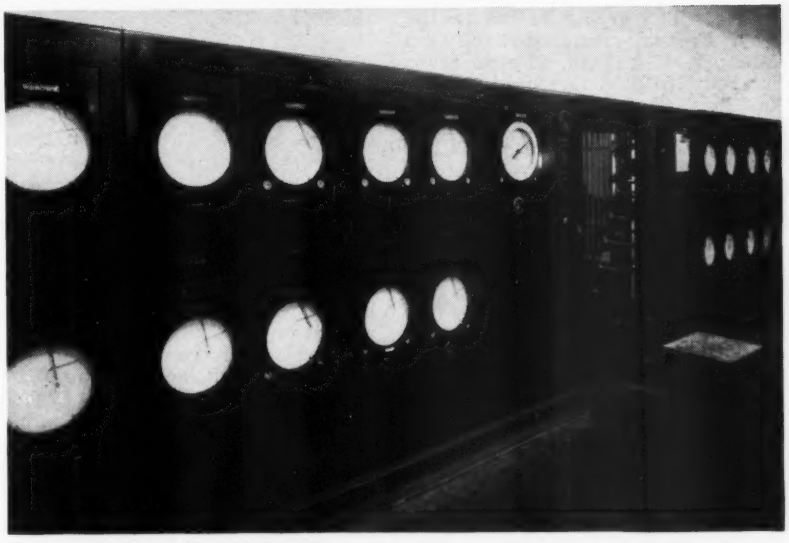
The operation is completely stable and the cycle is self-balancing. If the quantity of still gas should increase, the stripping action increases —as a direct result—and the quantity of noncondensable vapors entering the still is reduced, thereby opposing a further increase in the cycle gas.

Absorption Oil Cycle

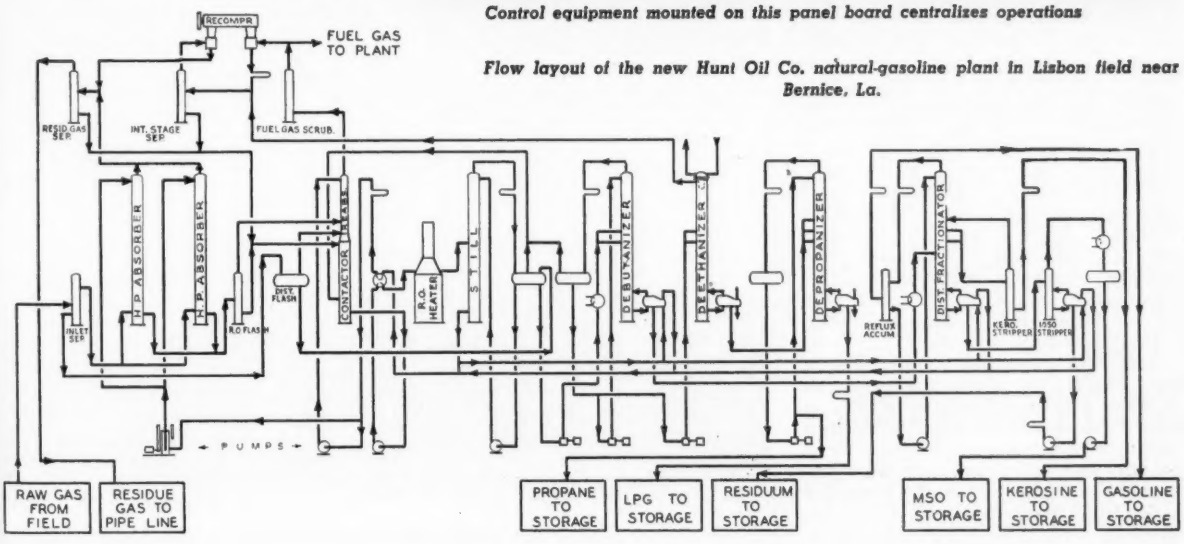
Flow of gas and oil streams through the Lisbon plant is as illustrated in the accompanying flow chart. The raw gas enters the plant through an inlet separator where its distillate content is removed. From there the gas goes to either of two 58.5-ft., 30-tray absorption towers operated at 1,000 psig. and about 85° F. The dry gas then passes through a residue-gas scrubber to dehydration units where all traces of moisture are removed. Two such units, each consisting of two towers packed with a silica-gel type of desiccant, are provided so that one unit can handle the load while the other is being regen-



A portion of the plant's operating area is provided with a metal canopy for weather protection to the operating personnel



Control equipment mounted on this panel board centralizes operations



Flow layout of the new Hunt Oil Co. natural-gasoline plant in Lisbon field near Bernice, La.

erated. After being metered, the residue gas is taken either by Arkansas-Louisiana Gas Co. or Texas Eastern Pipe Line Co.

Rich oil is taken from the base of the absorber through liquid-level controls, and run through a flash tank where the pressure is dropped to 300 psig. These flashed gases, totaling some 1,400 M.c.f. daily, enter the contactor reabsorber just below the fifteenth tray. Pressure maintained on this 55.5-ft., 36-in., 18-tray column is about 125 psig. Rich oil from the flash tank enters the reabsorber on the sixth tray and contacts the ascending still gas as earlier described. In addition, some 50 g.p.m. of fresh lean oil are pumped over the top of the tower.

From the base of the contactor section the rich oil is pumped through oil-to-oil heat exchangers to a gas-fired oil heater. In the exchanger section the hot lean oil increases the temperature of the fat oil from about 95° to 370° F., and in the heater the temperature is further raised to 550° F. From the heater the oil goes to the still, entering on the twelfth tray. Pressure maintained on this 5-ft. o.d., 48-ft. high, 20-plate tower is about 135 psig. Overhead gasoline fractions, after being condensed, are run to a horizontal 9 by 50-ft. debutanizer feed surge tank which also serves as an accumulator for the still reflux.

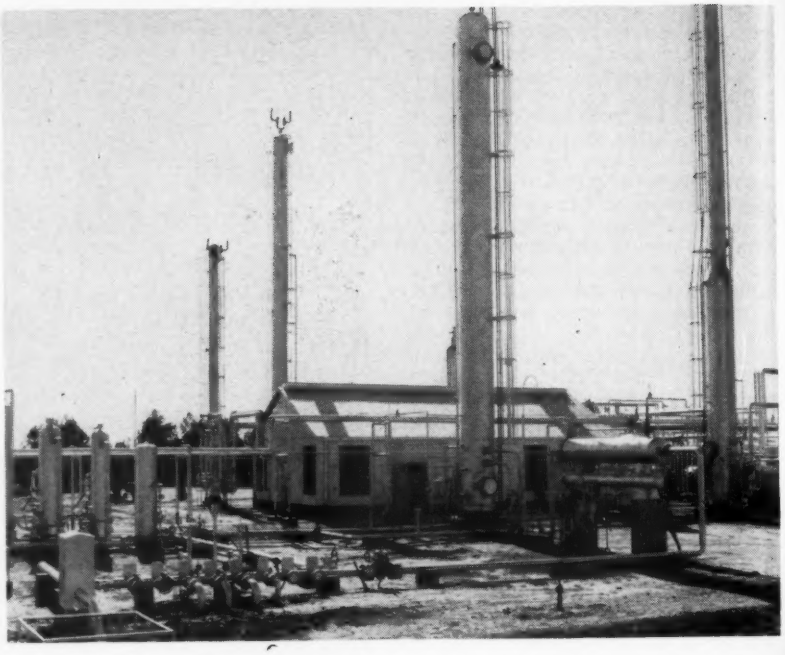
Removal of Hot Lean Oil

Hot lean oil is removed through a pressure control valve at the base of the still. A considerable portion of the hot oil is circulated to the reboiler sections of the debutanizer, distillate fractionator, and mineral-seal oil stripper where its heat is utilized in the operation of these towers. The partially cooled oil stream then rejoins the remainder of the lean oil before it is passed through the oil-to-oil exchangers and then further cooled before being returned to the absorption towers.

For pumping the 180 g.p.m. of lean oil required by the high-pressure abscorption towers, two Aldrich vertical triplex pumps are used. These pumps have 3⅛ by 8-in. plungers and are driven by 75 hp., 1,200 r.p.m. electric motors. For supplying the 50 g.p.m. lean oil required by the contactor reabsorber, a 10-hp. centrifugal pump is used, with a like unit in standby. Circulation of rich oil through the heating, stripping, and cooling phases is accomplished by means of a centrifugal pump driven by a 30-hp. Elliott steam turbine, with a like unit in standby.

Distillate separated from the raw gas before the absorption phase is started, totaling some 33 g.p.m., is kept separate from the rich-oil stream during the absorption cycle. Upon leaving the inlet separator the distillate is flashed from 1,000 to 350 psig. and then run into the raw-product feed tank. This tank has a weir installed near one end so that the still reflux is kept segregated from the remainder of the tank in which the distillate and raw feed accumulate. This segregation of distillate has the advantage of reducing the stripping-steam requirement of the still. Also, it eliminates any contamination of absorption oil by high-boiling constituents which might be present in the distillate.

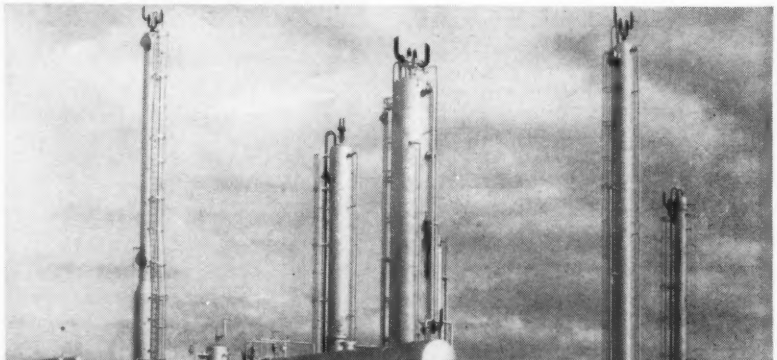
Gaseous fractions released in this accumulator-feed tank, totaling some 970 M.c.f. daily, join any flashed vapors from the debutanizer reflux accumulator and are taken to the top of the contactor section of the reabsorber. Advantages of this step were described earlier in the article.



A section of Hunt Oil Co.'s new Harleton, Harrison County, Texas, plant

Fractionation of Products

Fractionation of the raw feed into finished products is accomplished in conventional fractionating equipment. The debutanizer is a 40-tray, 81-ft. column operated at about 290 psig. The distillate fractionator is a 3 by 51-ft. tower packed with 2 by 2 by ¼-in. stoneware rings. A kerosine cut is taken off about midway up this tower and fractionated to specification in a six-tray kerosine stripper. Bottoms from the distillate fractionator are run to the mineral-seal oil stripper,



The similarity in layout of both plants is illustrated in this view of the columns at Harleton

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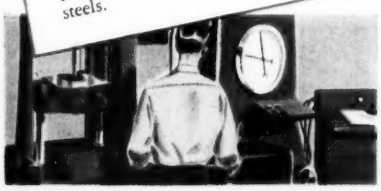

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a 2 by 22-ft. packed tower. Here the mineral seal oil fraction is taken overhead, condensed and run to storage while the residuum is cooled and likewise stored. Overhead gasoline vapors from the fractionating column are condensed and returned to the reflux accumulator. That in excess of reflux requirements is run through the gasoline aftercooler and stored in the gasoline blending tanks.

Overhead gases from the debutanizer are condensed and run to the debutanizer reflux accumulator which also serves as a feed surge tank for the deethanizer. This tower is a 2 by 58-ft. packed column operating at about 550 psig. and with a base temperature of 230 F. Light ends are run to the recompressor interstage separator while the bottoms are charged to the depropanizer, a 30-tray, 3 by 52.5-ft. column. Operation of this tower is regulated to give the desired grade of L.P.G. and propane.

While operation of the plant may vary slightly, in keeping with seasonal demand for finished motor fuel, L.P.G., etc., a typical day's output is as follows:

Products	Gal. per day
Propane, 95 per cent pure	8,500
Butanes, 95 per cent pure	12,650
Gasoline, 9-lb. R.v.p.	42,100
Kerosine	7,600
Distillate fuel oil (after lean-oil loss)	1,950
Residual fuel oil	500
Total	73,300
Residue gas, M.c.f.	46,457

A 4,250-gal., bulk-type ethyl-blending plant was provided so that in addition to regular-grade gasoline, a house-brand and Ethyl gasoline are blended at the plant site. All gasoline is transported through a 4-in. line to El Dorado, Ark. Other products are shipped through 8-mile pipe lines to an eight-car loading rack on the Rock Island Railroad at Bernice. These lines consist of a 2½-in. kerosine line, 3½-in. propane line, and a 3-in. L.P.G. line. A four-spot loading rack is also provided at the plant site for handling local tank-truck trade.

For storing the finished products, the following tankage is provided at the plant site: two 700-bbl. horizontal propane tanks, three 850-bbl. L.P.G., two 4,000-bbl. floating-roof for gasoline, three 500-bbl. kerosine, and one 1,200-bbl. for mineral-seal oil, and a 500-bbl. tank for residual fuel oil. In addition, 11,500-bbl, of gasoline storage is provided at the pipe-line pumping station, and a 500-bbl. kerosine tank at the railroad loading rack.

Auxiliary Facilities

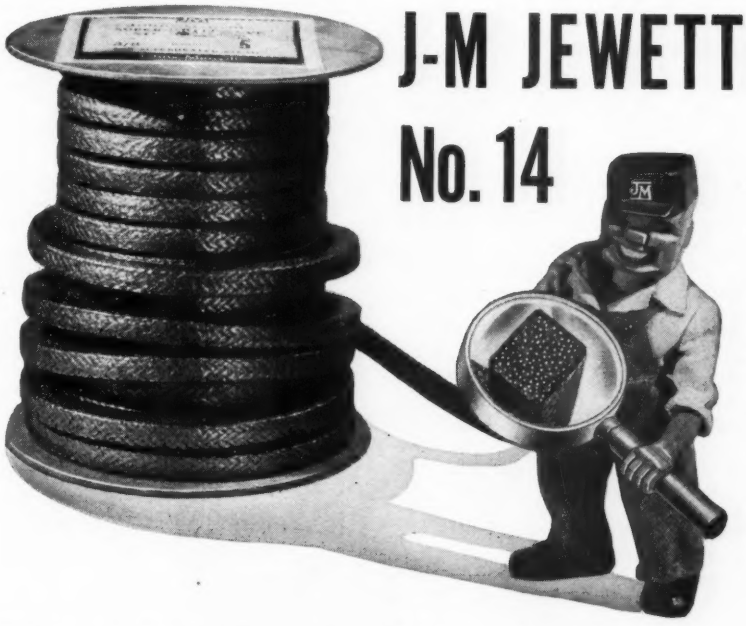
Electric-power requirements are supplied by a turbogenerator with a similar unit in standby. These units are 200-kw., 480-volt, 60-cycle alternators driven by steam turbines.

All cooling and condensing of products is accomplished in an induced-draft cooling tower, which consists of three 18 by 24-ft. cells each equipped with a 14-ft. fan driven by a 25-hp. motor. Capacity of the tower is 2,000 g.p.m. Temperature of the water over the tower is 126° F. while that of the cooled water is 87°. Water for the plant is supplied by a 425-ft. well which produces some 700 g.p.m. Steam is supplied by six 150-hp. 270-psig. working-pressure boilers.

Oil-Gas Institute to Be Held at S.M.U. March 23-26

An oil and gas institute, sponsored by the Southwestern Legal Foundation, will be held at Southern Methodist University, Dallas, March 23-26, for lawyers in the southwest region interested in this particular phase of the law, Gordon R. Carpenter, executive secretary of S. L. F., has announced.

Sixteen lectures by eminent experts in their fields will be divided into eight sessions devoted to oil and gas law, and eight sessions especially devoted to taxation as applied to oil and gas, Carpenter said. A. W. Walker, Jr., director of research of the foundation; Walace Hawkins, general counsel, Magnolia Petroleum Co.; and J. Paul Jackson, foundation taxation committee chairman, are in charge of arrangements.



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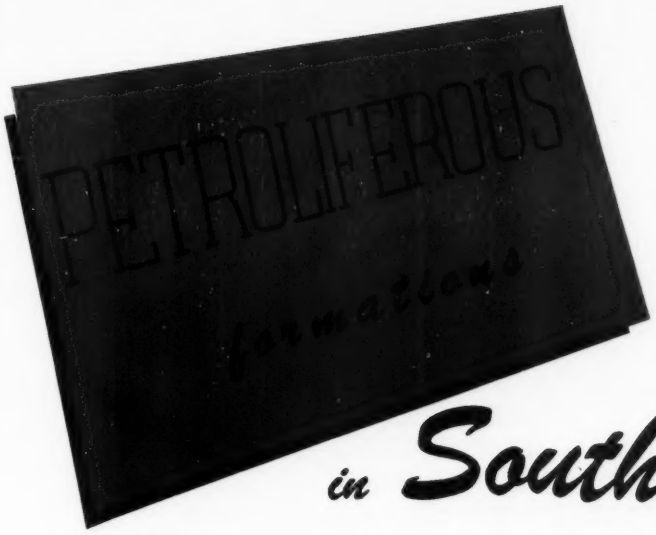


in Southeastern Ohio

by Orton C. Dunn, Jr.

SOUTHEASTERN Ohio in the vicinity of Marietta is second only to the Venango area in northwestern Pennsylvania from a historical standpoint in oil production. The Indians used oil seeps from formation outcrops for medicinal and ceremonial purposes. Bore holes drilled in the early Nineteenth century for salt and coal also produced oil which was then considered a nuisance.

In 1860 the famous Macksburg pool was opened when the Shallow Macksburg 60-ft. sand was struck. Four years later 14 different oil-producing formations had already been tapped, when George Rice opened the Berea grit at 1,400 ft. The deepest well drilled in the area to date is a test of the Red Medina formation topped at 7,801 ft. Sylvania Co. in Independence Township of Eastern Washington County, drilled the well, total depth of which was 7,889 ft. The well was abandoned in 1933.

Principal Productive Formations

The principal oil and gas-bearing formations of the region are: (1) the Carboniferous, which in turn is subdivided into two series; the top being the Coal Measures extending from the Goose Run sand down through the Maxton sand; and the Lower Carboniferous, ranging from the top of the Maxville or Mountain limestone through the Berea grit; (2) the Devonian formed by the Ohio shales; (3) the Silurian extending from the lower Helderberg sand through the Clinton sand, and (4) the Ordovician extending down through the Trenton limestone.

Insofar as oil production in eastern Ohio is concerned, consideration of the Ordovician need be given only to the upper half of the series. Dr. Edward Orton divided the Ordovician as follows: (1) Cincinnati series 300-750 ft. in thickness; (2) Utica shales 0-300 ft.; (3) Trenton limestone. The Trenton limestone is one of the most important sources of oil in Ohio, mostly from the central through the western part of the state. It underlies the entire state and outcrops only along the Ohio River in the most southwestern part of the state. In Adams County it is 650 ft. thick but in northwestern Ohio it exceeds 780 ft. in thickness. Production in the Trenton trends from the north and west to the southeast. Due to its extreme depth in the southeastern part of the state it is not productive as yet in that area.

The Clinton sand in the Silurian division is the next most important producing formation in Ohio. Dr. Orton divided the Silurian into the following groups: (1) lower Helderberg limestone 50-600 ft.; (2) Niagara limestone and shale, 125-380 ft.; (3) Clinton group, 30-150 ft.; (4) Medina shale and sandstone. The lower Helderberg is productive in Ashtabula County.

The Devonian as found in Ohio was classified by Dr. Orton as follows: (1) Ohio shales, 250-3,000 ft.; (2) Olentangy shale, 0-25 ft.; (3) Devonian (Carboniferous) limestone, 0-75 ft. The Ohio shales alone are productive and they are gas bearing.

The Carboniferous has been divided into three classifications: the Lower Carboniferous; the Coal Measures, and the Permian. Oil and gas-bearing formations are restricted in Ohio to the first two members and it is with these that southeastern Ohio is primarily concerned (see tables).

Berea Grit Formation

The Berea grit formation is the deepest zone in the Carboniferous division which has produced oil up to the present in southeastern Ohio. The formation is the most extensive sandstone in the state and underlies more than one-third the area of Ohio. The sand composition is gray with a trace of yellow and is constant and very

The Author

Although considerable work has been done on correlation of the oil-bearing formations in Southeastern Ohio by state and private concerns, very little information has been published. The data given here have been collected by the author through contacts with geologists, from private companies, from reviews of the published works of the Geologic Survey of Ohio, and his own work in oil-field exploration and operations. Southeastern Ohio has long had many gas-repressuring projects and many of the sands discussed have been and are now being operated under that method.

The author, consulting engineer at Marietta, Ohio, is a third-generation member of a pioneer Pennsylvania-Ohio oil family. After attending Ohio State and Oklahoma Universities, he started as a roustabout for the Smith-Dunn interests and worked up to chief petroleum engineer. In 1938 Dunn entered the oil business as independent producer and consultant and has been so engaged ever since, with exception of the war years during which he served as a member of the U. S. Army, Corps of Engineers.

LIST OF OIL AND GAS FORMATIONS

Productive formations in the Lower Carboniferous and the Coal Measures as found variously in Ohio, West Virginia, and Pennsylvania, classified as known by both proper and driller's nomenclature, are as follows:

1. Goose Run sand.
2. Mitchell sand, Horseneck sand (West Virginia).
3. Wolf Creek sand, Macksburg 80-ft. sand, Heavy Oil sand.
4. Macksburg 140-ft. sand, Chesterhill Peeker sand.
5. First Cow Run sand, Buell Runn sand, Cambridge limestone.
6. Mahoning sand.
7. Dunkard sand, Macksburg 300-ft. sand, Saltsburg (in Pennsylvania).
8. Dunkard Second Pay, First Salt sand.
9. Macksburg Peeker sand, First Gas sand.
10. Macksburg 500-ft. sand, Freeport sand, Clarion sand.
11. Macksburg 500-ft. stray, Clarion Gas sand.
12. Macksburg 600-ft. sand.
13. Macksburg 700-ft. sand.
14. Macksburg 800-ft. sand, second Cow Run sand, first Salt sand, Homewood sand.
15. Salt sand.
16. Maxton sand.
17. Maxville limestone, Mountain lime and sandstone in Ohio, and Greenbrier limestone in West Virginia.
18. Keener sand-blue.
19. Keener sand-white.
20. Big Injun sand, Burgoon sand.
21. Squaw sand, Sharpsville sand.
22. Papoose sand.
23. Weir sand.
24. Berea grit sand, First sand (in Pennsylvania), Butler 30-ft. sand, Murraysville sand.
25. Berea Stray, McConnelsville gas sand.
26. Second sand, Ganiz sand, One-Hundred Foot sand, Rosenbery sand.
27. Thirty-Foot sand, Nineveh 30-ft. sand.
28. Boulder sand, Hickory sand, "Stray-Stray" sand, Blue Monday sand, Gray sand.
29. Third sand, Gordon sand, Campbell sand.
30. Gordon stray.
31. Fourth sand.
32. Fifth sand, Mannington sand.
33. Sixth sand, Bayard sand.
34. Elizabeth sand.
35. Warren First sand.
36. Warren Second sand.
37. Warren Third sand, Speechley sand, Glade sand.
38. Tiona sand, Clarendon sand.
39. Balltown sand, Cherry Grove sand, Gartland sand.
40. Sheffield sand, Cooper sand.
41. Bradford sand, Deerlick sand.
42. Kane sand, Elk Group sand, Smithport sand.
43. Oriskany sand.
44. Clinton sand.
45. Medina sand.
46. Trenton limestone.

uniform, of moderate fineness, and mostly silica. Carbonate of lime constitutes a very small fraction of its composition. The formation varies in thickness from 50 ft. or less in the northern part of the state to 6 ft. or less in the extreme southeastern part.

The Berea grit lies under the Berea (Sunbury) and Cuyahoga shales, which have an aggregate thickness of from 500 to 600 ft., and on top of the Ohio shales, which thicken rapidly to the east. The formation is marked by its persistence; is easily recognized by the driller; it is a stratigraphic marker of great value.

While traces of oil and gas have been encountered wherever the formation has been penetrated, commercial production is limited more or less to Lorain, Trumbull, Columbiana, Stark, Jefferson, Harrison, Belmont, Guernsey, Monroe, Noble, Vinton, Perry, Athens, Morgan, and Washington counties. It is also a prolific producer east of the Ohio River in West Virginia and Pennsylvania.

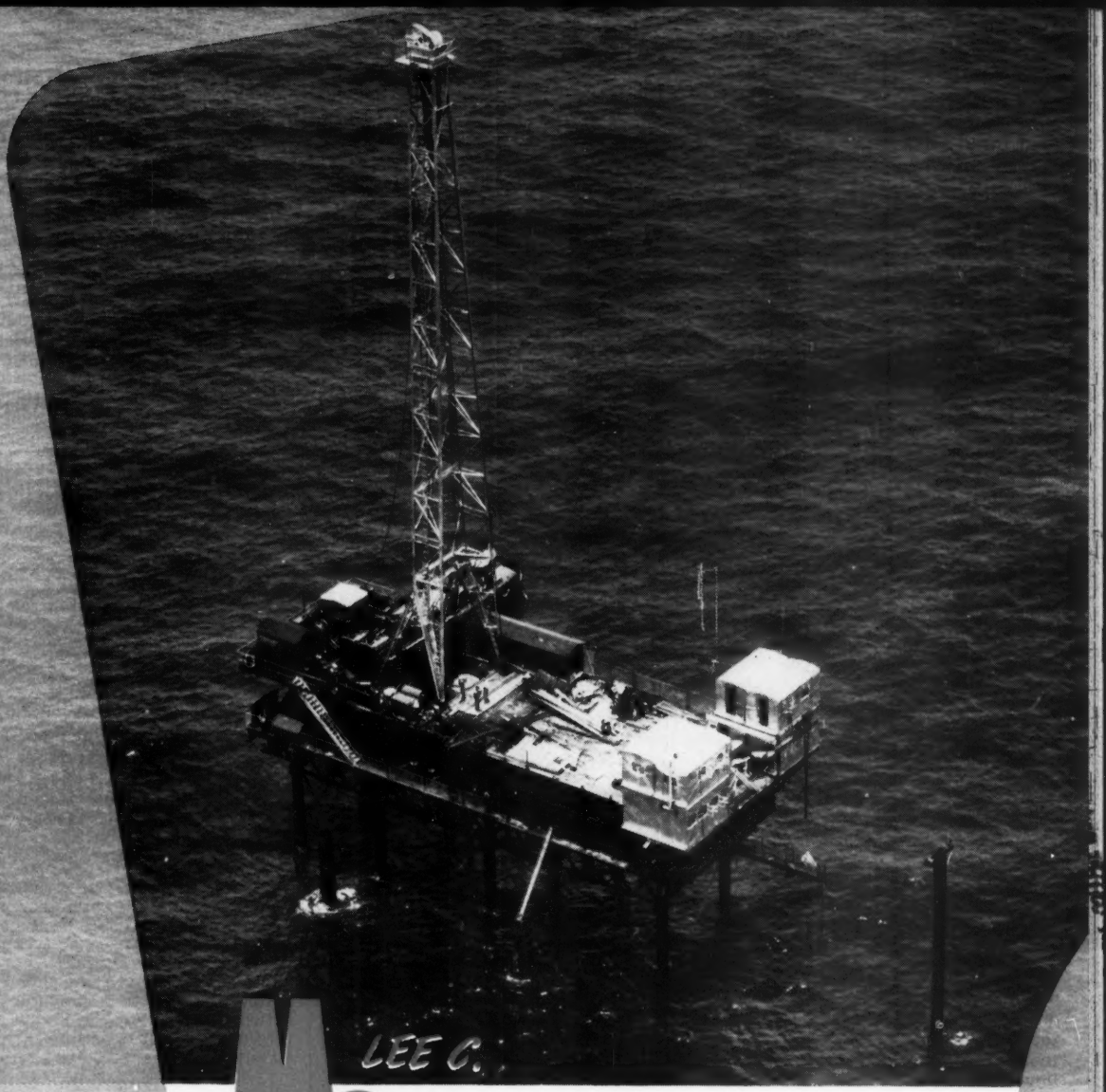
Big Injun Series

The Big Injun series consists of the following members: Keener sand, Big Injun sand and Squaw sand; limited above by the Lower Carboniferous or Maxville limestone (the so-called "Big lime" by drillers in Monroe and Washington counties). This group varies greatly, sometimes occurring as a great sandstone mass and at others broken and interspersed with alternating beds of slate and sandstone.

The Keener sand lies immediately below the Maxville limestone and is usually separated from the lime by a few feet of shale. The texture varies considerably, usually coarse and open, sometimes conglomeritic. It is an important source of oil and gas in Monroe and eastern Washington counties.

Separated from the Keener sand by a bed of slate is the underlying Big Injun sand, although occasionally they run together and are jointly called the Big Injun. The sand resembles the Keener, but it is the thickest of the series. Recognizable in

Map of oil and gas fields in Ohio. Axes of major anticlinal folds in eastern part of state are shown. On profile "A-A" on map, from Lancaster, the Bedford and Ohio shales thicken as they dip eastward toward the Ohio River



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several southwestern counties, it is an important commercial producer of oil and gas in the southeastern part of Ohio. To the north and west the formation becomes very broken and carries no hydrocarbons.

The Squaw sand, occurring below the Big Injun, and separated by a thin bed of shale, is decidedly patchy, similar in texture to the other sands of this series, never extends over large areas in Ohio, and at its best is a small producer in Monroe County. To the west this group is called the Logan formation and consists of a conglomerate of sand and shale. The conglomerate is essentially quartz rock, the largest pebbles not exceeding ½ in. in diameter. The sandstone is usually yellow or brown. Its characteristics are not constant and identification is sometimes extremely difficult.

The Maxville limestone or Big lime, is the summit of the Lower Carboniferous and serves as a marker for the driller. The formation is wedge shaped with its apex to the northwest, and attains maximum thickness of 100 ft. in Ohio. It is most evident in Monroe and Washington counties and the southwest corner of Belmont County.

The Coal Measures

The Coal Measures are divided for convenience into: first, the Pottsville group occurring between the Sharon coal and the Maxville limestone and containing two sands worthy of notice, the Salt and Maxton; and, second, the Coal Measures proper containing many strata that have been, or are now, sources of commercial oil. The Maxton rests immediately on top of the Maxville limestone although occasionally separated by a few feet of shale. Small in areal extent and exceedingly patchy, it is found in Monroe and Washington counties and produces commercially.

The Salt sand is just what its name implies and was the source of brine for the salt industry in Ohio which started in the middle 1800's. However, this formation produces considerable oil and gas. It is sometimes confused with the Big Injun series in areas where the Maxville limestone is not in evidence. The Salt sand extends north into southern Monroe County but is more prolific to the south and west.

The Coal Measures proper are formed by a large number of strata and produced the first commercial oil boom in Ohio. Sands found in this horizon were given local names which resulted in much confusion until correlated by later development. The most important formations include the second Cow Run sand, the Macksburg 500-ft. sand, the first Cow Run sand, the Goose Run sand, and the Mitchell sand.

The second Cow Run sand, also known as the Macksburg 800-ft. sand, composing the base of the Coal Measures proper, is not the least of the five major members forming this group and is the first sandstone above the Salt sand, being separated from the latter by approximately 80 ft. of shale. This sand at Cow Run lies 760 ft. below the Pittsburgh or No. 8 coal with a 400-ft. interval below the first Cow Run sand, and corresponds with the Macksburg 800-ft. sand at Macksburg as shown in West Virginia Geological Survey, Vol. 1, page 299 (Professor White). In Bulletin No. 1, Fourth Series, Geological Survey of Ohio, Prof. J. A. Bownocker declares: "If Professor White is correct in the opinion expressed in the last paragraph, the 500-ft. sand and the second Cow Run are not equivalent, but the latter lies 90 ft. below the former. It will be noted that he regards the 800-ft. sand as more probably the equivalent of the second Cow Run. The interval between the first and second Cow Run sands at Cow Run, where the deeper sand is named, is 400 ft. That at Macksburg, between the 140-ft. or first Cow Run and the 500-ft. sand is but little more than 300 ft., while that between the 140-ft. and the 800-ft. sands is almost 400 ft. These relations support Professor White's claims."

The second Cow Run sand is reported quite frequently throughout the area and is a recognized marker in adjoining West Virginia. However, the driller gives this name to almost any sand lying from 100 to 500 ft. below the first Cow Run. Occurring just above the Salt sand with an intervening bed of shale usually 80 ft. thick, and occasionally being divided by laminations of shale with the oil found in the lower section in such instances, it is clearly identified as the Massillon sandstone. Incidentally, it is also the thickest member of the series.

The Macksburg 700 and 600-ft. sands and the Stray sands cover a small area and are exceedingly patchy; they were named by drillers without regard to elevation and the eastward trend and thickening of the formations.

The Macksburg 500-ft. sand originally was considered important only in the Macksburg area but the producing formation has extended in many directions but mainly towards the east, south, and southwest. It is most prominent in Washington County where the sand ranges from 10 to 70 ft. in thickness, is quite coarse and of grayish color, but is not a conglomerate. Stratigraphically considered, the position of this formation indicates that it is the Tionesta sandstone near the top of the Conglomerate Coal Measures. It is about 670 ft. below the Meigs Creek coal and about 400 ft. below the first Cow Run sand and its occurrence in relation to the Cambridge limestone and the Dunkard sandstone supports this contention. It is one of the most pro-

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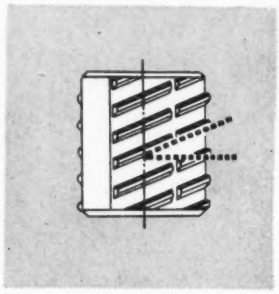

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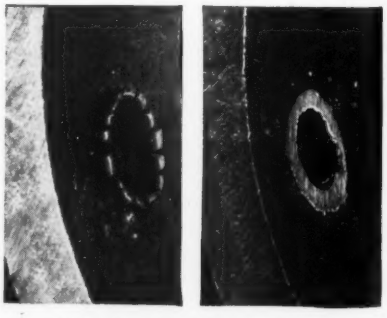

Perforation Burrs Removed Cleanly

Unretouched photograph of gun perforation before and after removing burrs with Security Casing Scraper. Photo on right shows burr is actually cut (sheared) away, not crushed or broken. For economical scraping, specify Security.

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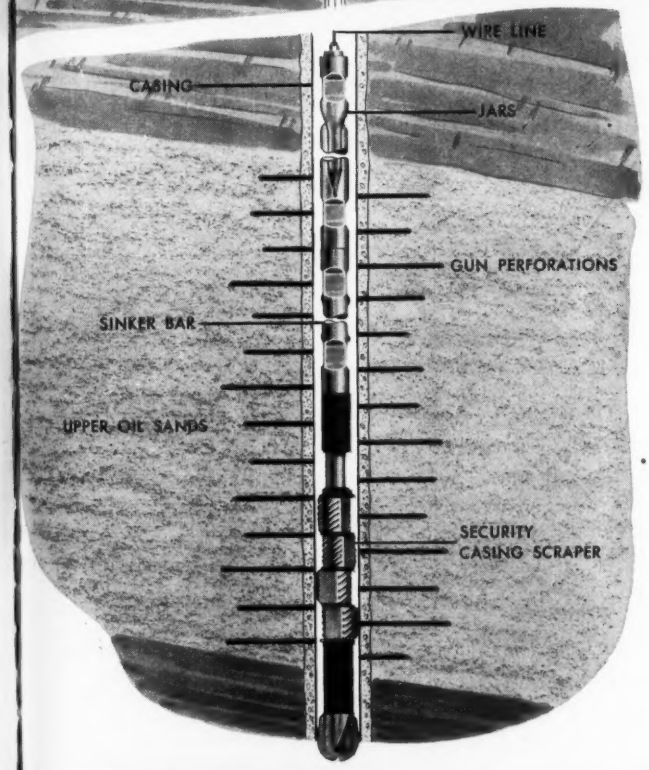
WELL HISTORY: *Depleted production required recompletion at upper pay zone. Gun perforated at 10,000 feet opposite new pay.*

PROBLEM: *Economically scrape casing perforations without rotary equipment.*

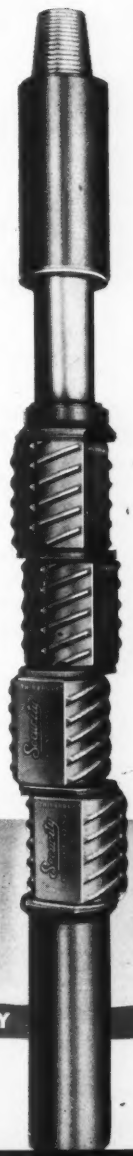
How would you Scrape Casing Without a Rotary?



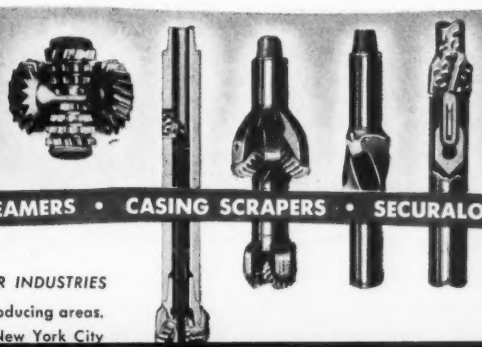
The production superintendent of a large oil company was faced with the problem of scraping 7" casing which had been gun perforated with 150 holes at a depth of 10,000 feet. The only work-over equipment on the job was a small pulling unit backed up to the standard derrick.

The only way he could solve the problem, without moving in rotary equipment, was to run a Security Casing Scraper on wire line. He ran a 7" Security Scraper on ⅝" wire line with a sinker bar above the Scraper and a set of jars above the sinker bar. The scraper was run up and down through the gun perforated section. Only three hours were consumed in this operation, including running in and out of the hole. Packers were run through the scraped section and set without difficulty.

This is a typical example of how the Security Casing Scraper can reduce your work-over costs because it is the only Scraper which does a complete job when run on drill pipe, tubing or wire line. Call your Security Field Representative when you are ready for your next scraping job.



Security



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ductive sands of the series.

The first Cow Run sand is the most important and best known formation of the group and is easily recognized. It lies on top of the Cambridge limestone and is sometimes separated from it by a thin bed of shale. The cap is a tight gray fine silica, well cemented with carbonate of lime, devoid of oil, and usually several feet thick. The oil-bearing sand is normally a coarse silica and quartz, loosely cemented, extremely porous, and light gray in color. In some instances the coarse conglomerate forming the base is extremely hard and well cemented but is extremely porous and carries water. The conglomerate never exceeds 2 ft. in thickness and commonly contains pebbles measuring ¼ in. in diameter although some measuring ¾ in. have been found. The formation then changes to a tight compact sandstone. It is extremely spotty and meandering, but new extensions are constantly being discovered.

The Mitchell sand a few miles east of Marietta is the source of a small oil field. The sand is similar to the Cow Run but less conglomeritic, lying about 200 ft. above the first Cow Run and 90 ft. below the Pittsburgh coal.

The Goose Run sand lies about 200 ft. above the Mitchell in about the same area and is 100 ft. above the Pittsburgh coal. It is relatively unimportant as a producing horizon and is included in order to complete the stratigraphical record. It has resulted in a few wells and those have been small and produced for a short time only.

The Trenton limestone, which is the base of the series under discussion, extends from the Hudson Bay (Canada), south into Alabama and Georgia and westward from the New England states to the Rocky Mountains. From its outcrops at Cincinnati the formation to the northwest forms what is generally known as the Cincinnati arch. It dips in both east and west trends and is the base of the entire State of Ohio and all dips are from the far western part of the state to the northeast and southeast.

The rock flexures of eastern Ohio due to the uplift of the Appalachians are of great interest. The anticlines, terraces, folds, and synclines are faintly reflected but are unmistakably a part of the great series to which the Allegheny Mountains belong. The folds in central Pennsylvania and West Virginia are well developed where entire systems of Paleozoic rocks of 2 and 3 miles in length are bent and compressed into arches a mile or more in length. The number of distinct folds is considerable but in the western trend the flexures become less crowded and less pronounced, being reduced until the dip of the strata is as low as 1° and 2°. They are not important in the topography of the land, sometimes repre-

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Regulates input gas by frequency control, by tubing pressure, by casing pressure, or a combination of any two.

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The basic operating principle of the GOT-OLSCO Type "A" Pressure Controller is simple and accurate . . . and so flexible in design that only minor connection changes are required to adapt it to many services. These changes can be made in the field, in a minimum of time, without costly re-modeling.

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sented by a suspension of the usual dip or uplift which assumes a terrace-like arrangement.

Anticlines in Ohio

The Fredericktown anticline enters the state from southwestern Pennsylvania and is a very gentle fold which, although twice crossing the Ohio River, has no effect on its course. The axis gave rise to Smith's Ferry oil pool, the Berea production in Columbiana County, and a small gas field at East Liverpool.

The Wellsburg anticline enters Ohio from West Virginia a few miles south of Steubenville, its axis parallel to that of the Fredericktown feature. A distinct uplift is noted near Captina Creek which crosses Monroe County on a southwestern trend a few miles east of Woodsfield.

The Salisbury anticline lies 6 to 8 miles northwest of the Fredericktown and although the folding is gentle it is still definitely an arch and may be noted in Yellow Creek Valley. This extension apparently originated in Pennsylvania.

The Cadiz anticline is entirely confined to Ohio. It is somewhat more distinct and of greater force than those already described. It is best observed in Harrison County and the summit of the arch lies about 2 miles east of the center of Cadiz. It extends north and south passing through Barnesville gas field and Macksburg oil field. Continuing southward, it strikes about Lowell and accounts for the extension of the Macksburg 500-ft. sand production across the Muskingum River and possibly influences the extension of the Parkersburg syncline that enters Ohio just east of the Belpre.

The Cambridge anticline though feeble is still distinctly traceable. The summit of its axis lies about a mile east of Cambridge.

Entering on a northeasterly trend from West Virginia into eastern Washington County a few miles west of Newport is the Eureka-Volcano-Burning Springs anticline which originates at the south line of Ritchie County, West Virginia. The fold becomes very gentle after it enters Ohio. The Sistersville anticline enters Ohio just south of New Matamoras on a southwesterly course and it is quite possible that these anticlines meet to form Cow Run and Sistersville pools and the Keener area near Duecher, Ohio.

The Trenton is at its deepest in eastern Ohio from Marietta to Belmont if the depth of the Berea is used as a basis for the trend of this limestone formation. Between Marietta and Belmont the Berea is 800 ft. below sea level. The Berea sandstone rises to 925 ft. above sea level in Trumbull County of northeastern Ohio. 1,125 ft. in Huron County of north central Ohio, dips to 850 ft. in Delaware and Franklin counties of central Ohio, and rises again to 1,300 ft. above sea level in Adams, Ross, Pike, and Scioto counties in the southwest. Sea level is approximately 600 ft. below the valley lands surrounding Marietta. There are numerous terraces, faults, anticlines, synclines, domes, and arches but all are extremely faint.

DUAL PRIME CONSTRUCTION MAKES THE BIG DIFFERENCE

Pictured is another example of the outstanding superiority and dependability of CMC Dual Prime Centrifugal Pumps. This particular pump (CMC Model 1065) is unloading barges for the Cluney Towing Company, Lake Charles, Louisiana. Pump is handling 1500 to 1600 gallons per minute at a discharge pressure of 45 PSI. This is the initial installation on a new application and the excellent performance of the pump has resulted in additional orders from this firm. It is interesting to note that the CMC model shown above out-performed and out-lasted rotary pumps in use at the same time.

CMC Dual Prime pumps have *unmatched* self-priming speed . . . the last word in *simple, rugged, fool-proof* construction.

Write today for latest catalog. Sizes range from 1½" to 10"—3,000 to 200,000 gallons per hour.

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Black Mesa Basin Test Gets Granite High

Reaching granite at 3,432 ft., some 2,000 ft. higher than anticipated, General Petroleum Corp. 14-6 Creager State, in 6-19n-23w, Navajo County, Arizona, a key Black Mesa basin test has been abandoned. This well had a show of oil at 1,510 ft. in the Coconino sandstone, but main hopes were in formations of the lower section which were cut out by the high granite. General Petroleum is now shooting the area with seismograph to rework the territory, before making future drilling plans.

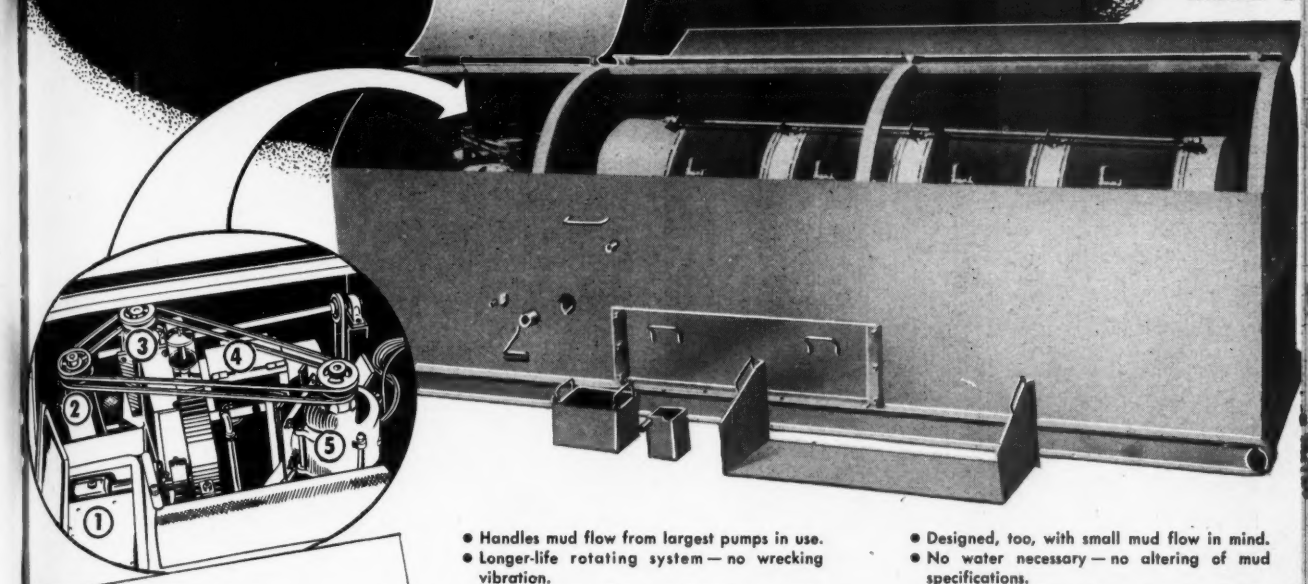
Another Black Mesa basin test, L. M. Lockhart 1 Babbitt, in 21-27n-9e, Coconino County, Arizona, has been abandoned at 3,623 ft. Lockhart will drill a second test about 30 miles south of Holbrook, the 1 Aztec Land & Cattle Co., in 33-14n-20w, on the Snowflake anticline.

Another Thompson First!

NEW ALL-ELECTRIC SHALE SEPARATOR

FOR DEEP WELL DRILLING

MODEL E

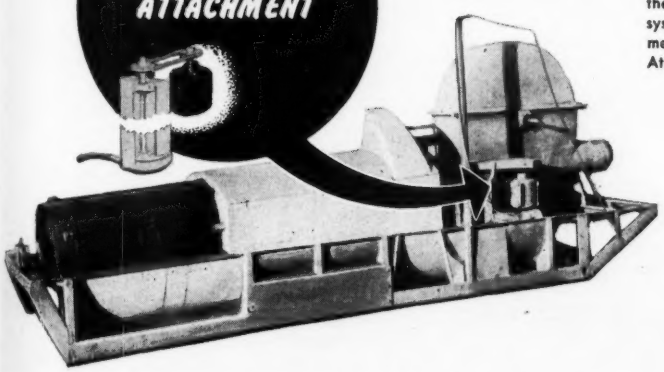


In above close-up view:
(1) By-Pass (2) Mud-Spray Pump
(3) Reduction Gear for Drum
(4) Sample Machine
(5) Explosive-Proof ¾ H.P. D-C Motor

- Handles mud flow from largest pumps in use.
- Longer-life rotating system — no wrecking vibration.
- Screen cleaned by mud-spray, pressure pumped electrically.
- Designed, too, with small mud flow in mind.
- No water necessary — no altering of mud specifications.
- Explosive-proof ¾ H.P. D-C motor rotates drum, powers spray pump.

Thompson is first again! The new All-Electric Thompson "EW" operates efficiently under all rates of mud flowage from the largest pump discharge to the gradually diminished discharge rate reached in deep drilling. Regardless of rate of discharge, the new All-Electric Thompson "EW" drum rotation is a constant 18 turns per minute; the screen-cleaning mud-spray jets also operate at constant pressure. All mud passing through is cleaned of destructive shale and abrasives. Mud-spray screen cleaning eliminates alteration of mud—this is of particular importance where oil base and high viscosity muds are used. Note how motor, transmission, pump, sample machine, and by-pass are combined in compact space for easier control and upkeep. Now, you don't have to take a chance on abrasive-polluted mud under any conditions—put this new All-Electric Thompson "EW" on the job!

CLOSE-UP VIEW OF
NEW ELECTRIC MUD-SPRAY PUMP ATTACHMENT



THOMPSON SELF-MOTIVATED SHALE SEPARATOR

The screen drum is rotated by the precision power wheel which is turned by the mud flow discharge from the pumps. Built-in water-spray screen cleaning system may be supplemented by Electric Mud-Spray Screen Cleaning Attachment shown on model at immediate left and close-up at far left. The Electric Attachment is available separately for conversion of your Thompson machine.

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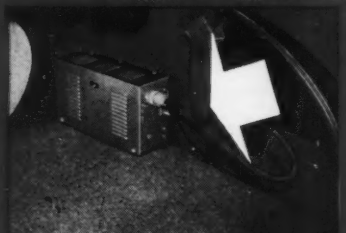
LOOK HOW MANY WAYS THE CARFONE CAN BE INSTALLED



—on the side

—on the bottom, right side

—on the bottom, left side

the RCA Carfone*

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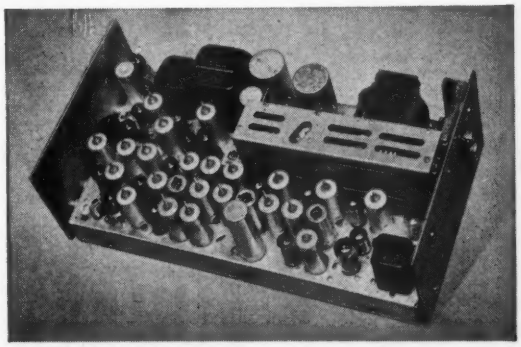
• For example, the All-New CARFONE combines a complete transmitter and receiver in one small compact unit (see opposite page) that provides the widest possible choice of installation locations in car or truck (see proof below).

For complete information *immediately* on the RCA CARFONE mail the coupon today.



Completely open, accessible construction puts every component and every connection "on top." In addition, the unit can be removed for service in thirty seconds.

*The RCA CARFONE is designed for every mobile radio application: police, fire departments, taxis, trucks, public utilities, buses, forestry, ambulances, pipe line services.

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GULF TUBING TOOL JOINTS Are Available In Two Types. The PB Type (Pictured) Makes Up On The Tubing Without Removing The Coupling. The DB Type Has A Female Tubing Thread In Each End For Converting A String Of Tubing To Light Drill Pipe.

GULF TUBING TOOL JOINTS Have The Same Outside Diameter As The API EU Tubing Couplings And The Same Bore As The API Tubing.

GULF TUBING TOOL JOINTS Are Precision Manufactured From Heat Treated Alloy Steel.

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Tubing Tool Joints Are Saving Time and Tubing On Gulf Coast Workovers

by Leigh S. McCaslin, Jr.

Left: Racked tubing equipped with set of tool joints for each stand. Actual tests have shown savings of 25-40 per cent over use of regular tubing couplings

TUBING tool joints are receiving increasing use by Gulf Coast operators on workover and completion operations where production tubing is used for the drill string.

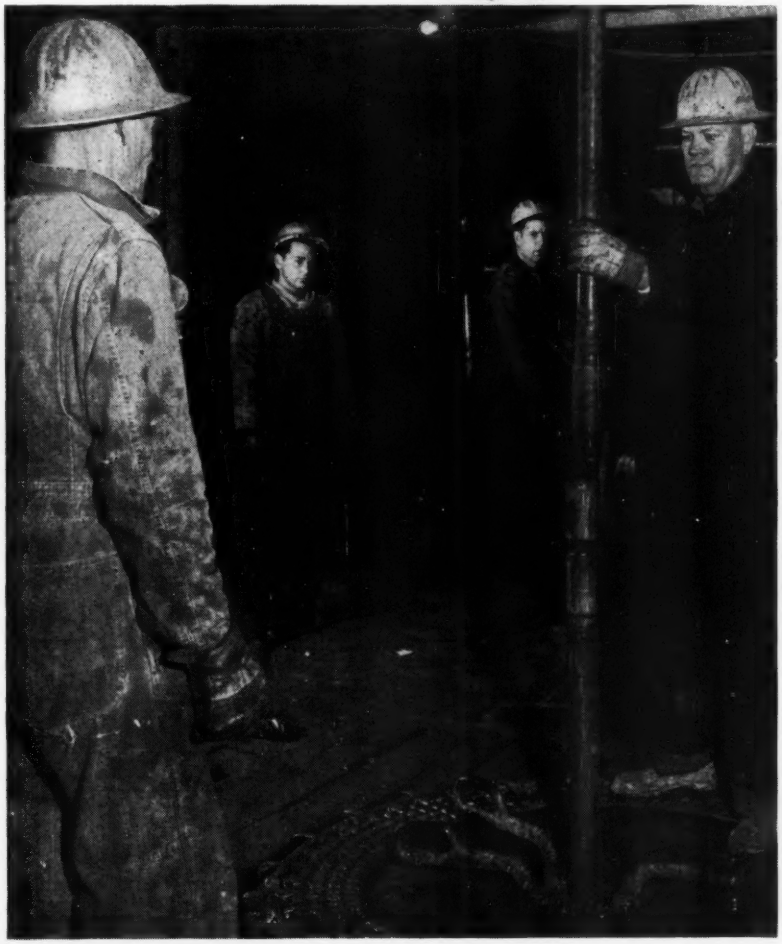
This relatively new procedure has been developed for two primary reasons: To protect the tubing points from excessive wear, and to shorten round-trip time.

During this period of tubular-goods shortage, it is important to conserve tubing wherever possible. The use of tool joints on the production tubing is a possible conservation measure. Regular tubing couplings, when subjected to continual breaking and makeup, will become worn in a short time and become subject to leaks. By installing tubing tool joints to the tubing couplings, wear and tear on the tubing collar threads are eliminated. All make and break thread wear, as well as tong and hammer wear, is taken by the tool joint rather than by the tubing and its couplings.

From the standpoint of shortening round-trip time, actual tests have shown that tubing equipped with tool joints can be run with speed equivalent to that of drill pipe. Time saved has been figured to be between 25 and 40 per cent in round-trip time.

A field test was recently made to obtain data on the time saving made possible by using tubing tool joints. Certain facts were known before the start of the test based on past experience with conventional 8 or 10-thread upset tubing. These were: During normal workover operations, screwing and unscrewing the tubing threads on each stand requires approximately 65 per cent of the total round-trip time. The remaining 35 per cent is consumed by hook travel, setting slips, and so forth.

The field test was made on a workover unit employing a jack-knife derrick handling doubles of 2½-in. E.U., 8-round thread tubing at a



This well, in South Aldine field, Harris County, Texas, is being completed with a tubing drill string equipped with tool joints. The latter protect the tubing threads from excessive wear and speed up round-trip time. Members of drilling crew are D. Shipp, H. O. Busbee, R. J. Tingle, and S. A. Harvey

depth of 9,200 ft. Actual time consumed during round trips averaged 8 hours. One hundred and fifty-three doubles of tubing were used making a total of 306 joints to be either screwed or unscrewed per round trip. By actual timing, screwing and unscrewing averaged 62 seconds each. After tubing tool joints were installed, screwing and unscrewing operations averaged 38 seconds or a reduction of 38.7 per cent. By multiplying 38 by 306, 3 hours and 13 minutes is obtained. Adding this time to 35 per cent of the 8-hour round trip, or 2 hours 48 minutes, round-trip time is found to average 6 hours 1 minute. This is a round-trip time saving of 25 per cent. During the test, it was noted that 12 to 15 turns were required to make up a tubing joint while only 3 to 3½ turns were required when tubing tool joints were in use.

At least one manufacturer has designed his tool joints with outside diameters the same as tubing couplings and inside diameters the same as the bore of conventional tubing. Hence, there is no restriction in the workover string for circulating, swabbing, coring, testing, cementing, fishing, or washover operations. By the same token, equipment such as slips, elevators, tongs, chokes, spears, and overshots may be used exactly as with tubing.

Tubing tool joints are machined with a tubing-pin connection down and tubing-box connection up. Thus they are installed direct to the tubing coupling with one joint to each stand of tubing.

Houston Oil a Pioneer

Houston Oil Co. of Texas has been one of the pioneers in the use of tubing tool joints for workover and completion operations. This company purchased a set of 100 2-in. joints in the fall of 1947 for use in the Texas Gulf Coast area. Before being sent to the machine shop for inspection the first time, these joints were used for 14 workover jobs, making a total of 124 round trips to average depths of 7,360 ft. These round trips break down as follows: squeeze jobs—42 (with pressures up to 5,200 psi.); drill-stem tests—40; drilling out cement—24; conditioning mud—11; testing casing—1; and circulating out sand —5.

During all this use, no tool joint leaked nor was any tubing discarded due to bad threads. Machine shop work costing $134.25 restored the tool joints to "like new" condition. They were thoroughly cleaned, machine work performed where necessary, and the joints painted and stored back in their permanent container.

W. B. Duncan, general superintendent of Houston Oil Co., has indicated complete satisfaction with tubing tool joints based on his company's experience. In his words, "During this period of tubular-good shortage, we feel that the joints have more than paid for themselves, and feel that they have many more round trips of service left in them."

Good Results in Louisiana

A major oil company has had good results with tubing tool joints in the deep wells of the Louisiana Gulf Coast area. This operator has 106 tool joints in use on a workover string. After the first 6 months of use, the tool pusher in charge is well satisfied with them. He is of the opinion that their use is a timesaver where more than two trips are to be made on a workover job. In other words, the time necessary to install them on the tubing coupling will be regained in two trips.

This company has used its workover string constantly since buying the tool joints. It has been used to squeeze wells with pressures up to 6,000 psi. and wells up to 13,000 ft. deep have been worked. During this time, no cutouts have been experienced. Although the time-saving factor is present, principal reason for use of the joints was to save the tubing.

Taking the bite out of weather

KOPPERS Bituplastic* Protective Coating does not "alligator." This is a major improvement over many types of coatings commonly used to protect exposed metal, concrete and masonry from the ravages of weather.

For when a protective coating "alligators" . . . breaks down into those unsightly cracks like the scales on an alligator's back . . . portions of the underlying surface are frequently exposed, and protective efficiency is lowered.

Koppers Bituplastic guards against that. It's also waterproof, fire-retardant, virtually odorless and tasteless. It withstands extremes of temperature. It's an effective vapor seal over insulation . . . and can be used as a bond between the surface to be insulated and the insulation itself. Koppers Bituplastic completely covers exposed surfaces with a thick, tough, quick-drying coating that provides effective, lasting protection against corrosion and deterioration.

To meet varying corrosive conditions, Koppers makes a complete line of Industrial Protective Coatings. Koppers representatives will gladly recommend the Coatings that will give your plant the best protection — that will hold your maintenance expense to a minimum. Write us for new Protective Coatings Catalog. There's no obligation incurred.

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With a HAPPY P & H STARTER it is not necessary to "spot" engine before starting . . . the P & H will roll your engine continuously until it starts . . . Foot operated . . . Quickly installed.

Stocked in nine sizes for starting engines rated 5 to 160 HP . . . Requires less space and is safer than air starting equipment . . . No piping, pressure tanks or gauges required.

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2—Summarization Statement on:

CONDENSATE RESERVOIRS

by Dr. Morris Muskat*

FROM a dynamical standpoint condensate-bearing reservoirs are essentially equivalent to dry-gas reservoirs. For practical purposes they may be described by the laws for homogeneous fluid flow, with the permeability corrected for the connate-water saturation.

The unique feature of condensate reservoirs lies in the thermodynamic phase properties of the reservoir fluid. Because of their characteristic composition and the relatively great depths at which such fluids are usually found, their resultant critical temperature lies below the reservoir temperature. If the fluid is in a single phase it must therefore be either an undersaturated or dew point gas.

On reference to the pressure-temperature phase diagrams of such systems it is clear that if the pressure is reduced below the dew point, even if the temperature is maintained constant, there will be a formation of liquid phase which, being a behavior contrary to that normally encountered in gas liquid systems, is termed "retrograde" condensation.

The importance of this observation is that if such liquid condensation takes place in an actual reservoir, due to fluid withdrawals and pressure decline, the liquid condensate will be trapped in the individual pores of the rock and will not be produced directly with the vapor phase. There will therefore be a loss of the condensable liquid components of the reservoir hydrocarbon mixture, and especially in the heavier portions, that are recovered at the surface as separator or stock-tank condensate. The recoverable liquid reserves from the field will be reduced, obviously affecting economics of development.

Many laboratory experiments have been performed on reservoir fluids from actual condensate-producing fields to determine quantitatively the degree of such liquid condensation and the potential losses in recovery. These vary with the initial composition of the hydrocarbon mixture and the reservoir temperature. Such losses may range from 30 to 60 per cent of the initial condensate content. There will also be losses of the intermediate hydrocarbon components, although these will be of a lesser magnitude. Most of these components will be produced along with the gas phase and be subject to recovery by multistage separation or plant extraction.

*Gulf Research & Development Co., Pittsburgh.

Field observations of reservoirs produced by pressure depletion broadly confirm the laboratory predictions. The primary evidence relates to the gas-oil ratio of the production. As the liquid condensate drops out in the reservoir and remains trapped in the pores of the rock, the residual coexisting gas phase will be correspondingly denuded of its recoverable hydrocarbon content. Accordingly, as production continues, the gas-oil ratio, as obtained in separators or stock tanks, should rise with declining reservoir pressure.

Must Maintain Reservoir Pressure

To prevent the development of liquid condensate within the reservoir and the associated losses in ultimate recovery it is necessary to maintain the reservoir pressure. While both water injection and gas injection would, in principle, serve such purposes, gas injection has actually been tried in a number of fields. Operations of this type in condensate fields, with the primary purpose of maintaining the pressure and sweeping out the wet gas without pressure decline, are termed "cycling."

The fundamental principles underlying cycling are basically sound. However, its value is determined primarily by the obvious economic requirement that the value of the resultant gain in recovery achieved thereby should exceed the operating cost. This economic balance involves a number of factors, including the uniformity of the reservoir formation, the magnitude of the retrograde losses, the depth of the producing section and the cost of the injection wells and injection facilities, the total size or volumetric content of the reservoir, and the market values of the hydrocarbon components.

If the reservoir is highly lenticular, variable in permeability, or badly stratified, the efficiency of the gas injection will be greatly reduced and so will the gain in recovery. The retrograde losses without cycling will be generally higher the lower the initial gas-oil ratio of the production. At the same time the total reservoir content must be high so as to represent a significant cumulative potential loss to be prevented by the cycling operations.

The reservoir depth will determine the cost of the injection wells and additional flow-line facilities which also have to be compensated for by the gain in recovery due to cycling. The value of the increase in recovered products and the probable future price trends will also evidently be major factors in controlling the economic gains from the operations.

The presence of oil bands of commercial significance underlying the gas cap and the possibilities of water-drive action must also be given consideration in determining the necessity or advisability of cycling.

In planning cycling operations, an attempt should be made to develop the maximum sweep efficiency for the displacement of the reservoir wet gas by the injected dry gas. This will be determined largely by the well distribution and formation geometry, and can be evaluated for various well patterns by electrolytic or potentiometric models. Of possibly greater effect on the sweep efficiency will be the permeability variations in the reservoir. While no completely satisfactory methods are available for fully evaluating the effects of nonuniformity in permeability, it is possible to derive upper limits by assuming idealized stratification conditions and calculating the resulting bypassing tendencies.

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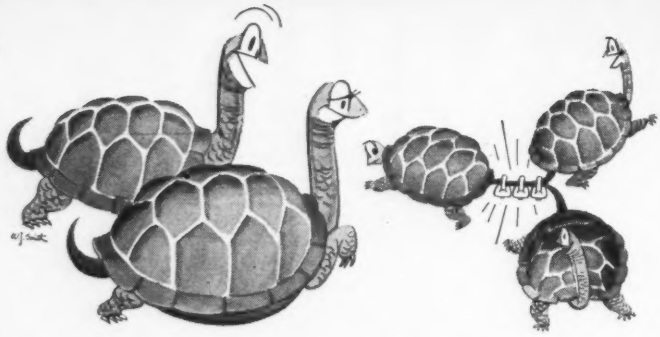

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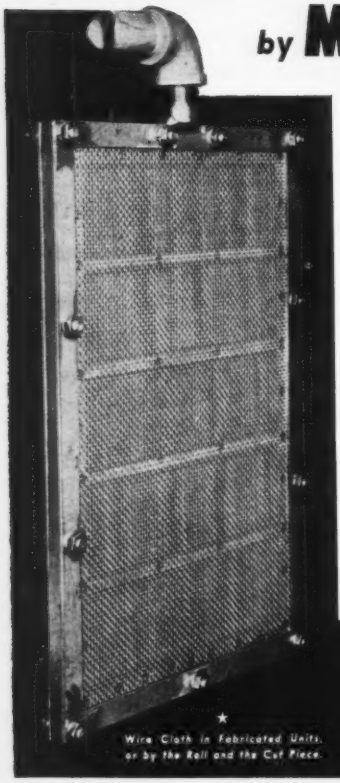

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Oil Production Under

UNITIZATION

in Wertz Dome Field, Wyoming

by E. A. Swedenborg

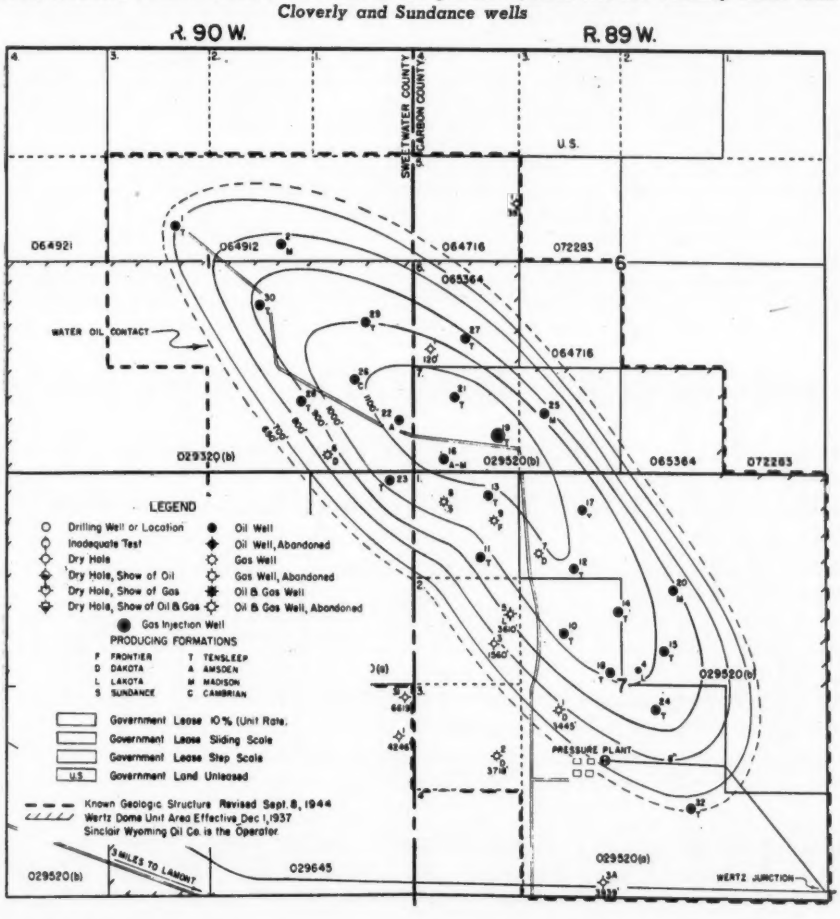
WERTZ Dome oil and gas field is located 88 miles southwest of Casper and 38 miles north and westerly from Rawlins, Wyo. It has been a producing field for 27 years, first as an important producer of gas and more recently of oil.

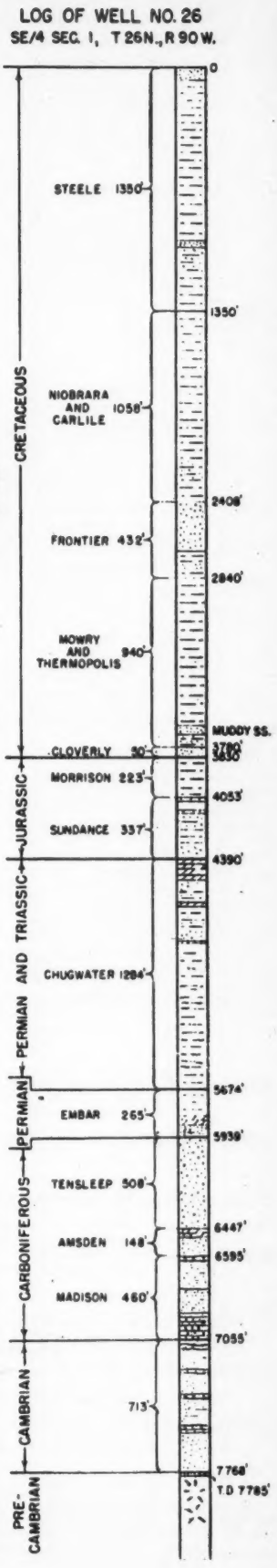
Oil Development

Sinclair Wyoming Oil Co. in December 1936, completed well No. 1Q, SE NW 7-26n-89w, at a depth of 5,886 ft., as the first Tensleep sand producer with an initial of 1,700 bbl. of oil per day. The well was originally drilled only 14 ft. into the sand and in August 1939 was deepened to 289 ft. in

Objectives of the unit agreement for Wertz Dome field, Wyoming (approved by acting secretary of U. S. Department of Interior, effective December 1, 1937), are to make possible a uniform withdrawal of oil and gas in order to maintain equalized reservoir pressures, and to permit the injection of gas for pressure maintenance. This article discusses the engineering practices employed and how the objectives of the unit agreement have been accomplished. The author is with U. S. Geological Survey, Casper, Wyo. Portion of paper presented at A.I.M.E. annual meeting, February 13-17, 1949, at San Francisco.

Below: Subsurface map of Wertz Dome. Structural contours are drawn on the Tensleep sandstone. Right: Geologic log of formations in the Wertz Dome area. Production comes from the Tensleep, Amsden, Madison, Cambrian, and others. Part of the gas for injection into the Tensleep comes from Cloverly and Sundance wells





the sand, and the daily production increased to 8,350 bbl. of oil. In February 1948 well No. 22, SE SE 1-26n-90w, was deepened from the Tensleep to the basal Amsden sand and completed at a depth of 6,635 ft. for an initial of 600 bbl. of oil per day in the basal Amsden. In April 1948, well No. 2, SW NE 1-26n-90w, was deepened from the Tensleep to the Madison limestone and was completed at a depth of 7,193 ft. for an initial of 1,145 bbl. of oil per day in the Madison. Well No. 26, SE SE 1-26n-90w, was deepened from the Tensleep to the Cambrian and in October 1948 it was completed in the Cambrian for an initial of 277 bbl. of oil per day.*

There is no state or patented land within the productive area and all mineral rights are vested in the United States and operations are subject to the federal oil and gas operating regulations. The Tensleep reservoir has a proven productive oil area of 650 acres. The Amsden, Madison, and Cambrian formations have not been sufficiently drilled to determine the limits of production but it is believed that they extend over acreages somewhat smaller than that of the Tensleep sandstone.

Tensleep Sandstone

The Tensleep sandstone thickness in four of the wells drilled through averages 450 ft., whereas in three of the wells wherein the sand was drilled through, it averages 540 ft. This fact along with similarity of crude oil, gas, and water found in the Tensleep, Amsden, Madison, and Cambrian formations indicates that at some time there may have been migration through faulting with respect to the above-mentioned formations. However, there is no indication of faulting at the surface.

The Tensleep sandstone is found at depths ranging from 5,800 ft. on top of the structure to 6,300 ft. near the productive limits. Porosity varies from 3.3 to 18.9 per cent, averaging 14 per cent. The permeability ranges from 0 to 337 md. with an average of 70 md. The connate water as determined by core analyses of cores taken from wells drilled, varies from a trace to 11 per cent, averaging 10 per cent for the oil-saturated sand section.

Twenty-five wells have been drilled to the Tensleep; one was outside of the producing limits and one at the water-oil contact. Twenty-four were producers ranging in productive capacities from 35 bbl. of oil per day on the pump to 8,350 bbl. of oil flowing. Twenty wells were good flowing producers of oil whereas four wells along the northern flank were small producers and were pumped.

It had become obvious by 1940, as the result of flowing production at various rates and observing drop in bottom-hole pressures, that it would not be long before all the wells would be placed on artificial lift or, the producing rate drastically reduced to equal the rate of water encroachment in order to utilize hydrostatic pressure. The question of injecting the Tensleep gas produced with the oil was considered but inasmuch as the produced gas had a carbon dioxide content of 52 per cent, and hydrogen sulfide content of 1.11 per cent, the problem of corrosion was a serious one in compressing the gas to pressures necessary for injection.

Sinclair Wyoming Oil Co., the unit operator, decided on a method of dehydrating the gas to prevent corrosion rather than removal of the hydrogen sulfide and carbon dioxide. The decision has been proved sound as the corrosion of equipment in the compression of the dehydrated gas has not been serious over a period of 7½ years of operation. The dehydration method also avoided shrinkage of gas volume that would have resulted from the removal of corrosive components in the gas.

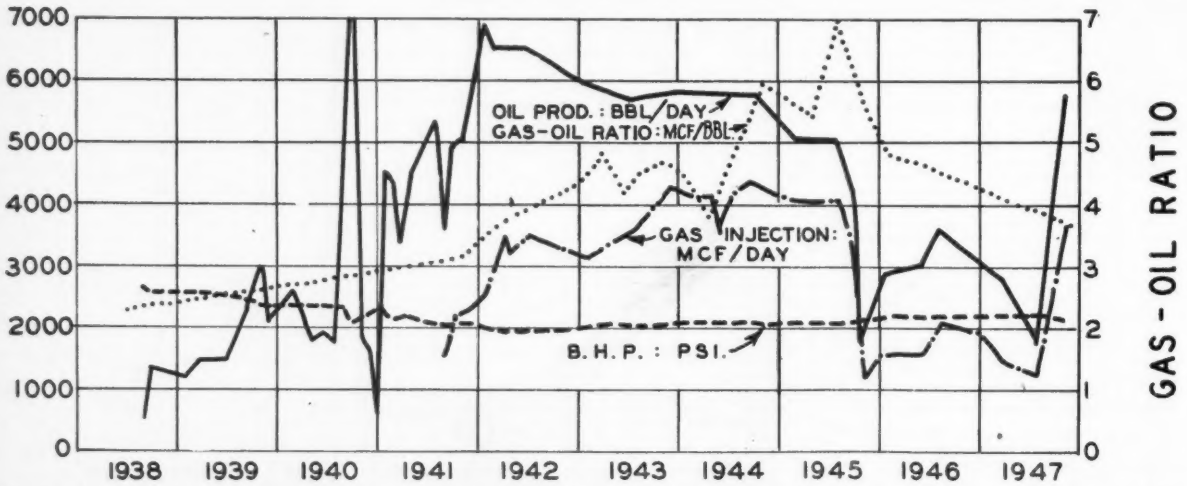
Pressure-Maintenance Plant

Three 600-hp. gas engine-compressor units boost the gas from an intake pressure of 30 psi. in three stages to a discharge pressure of 1,825 psi. Check valves in the final stage discharge lines protect the plant should the final stage go out and permit the field pressures to back up in the gas return system.

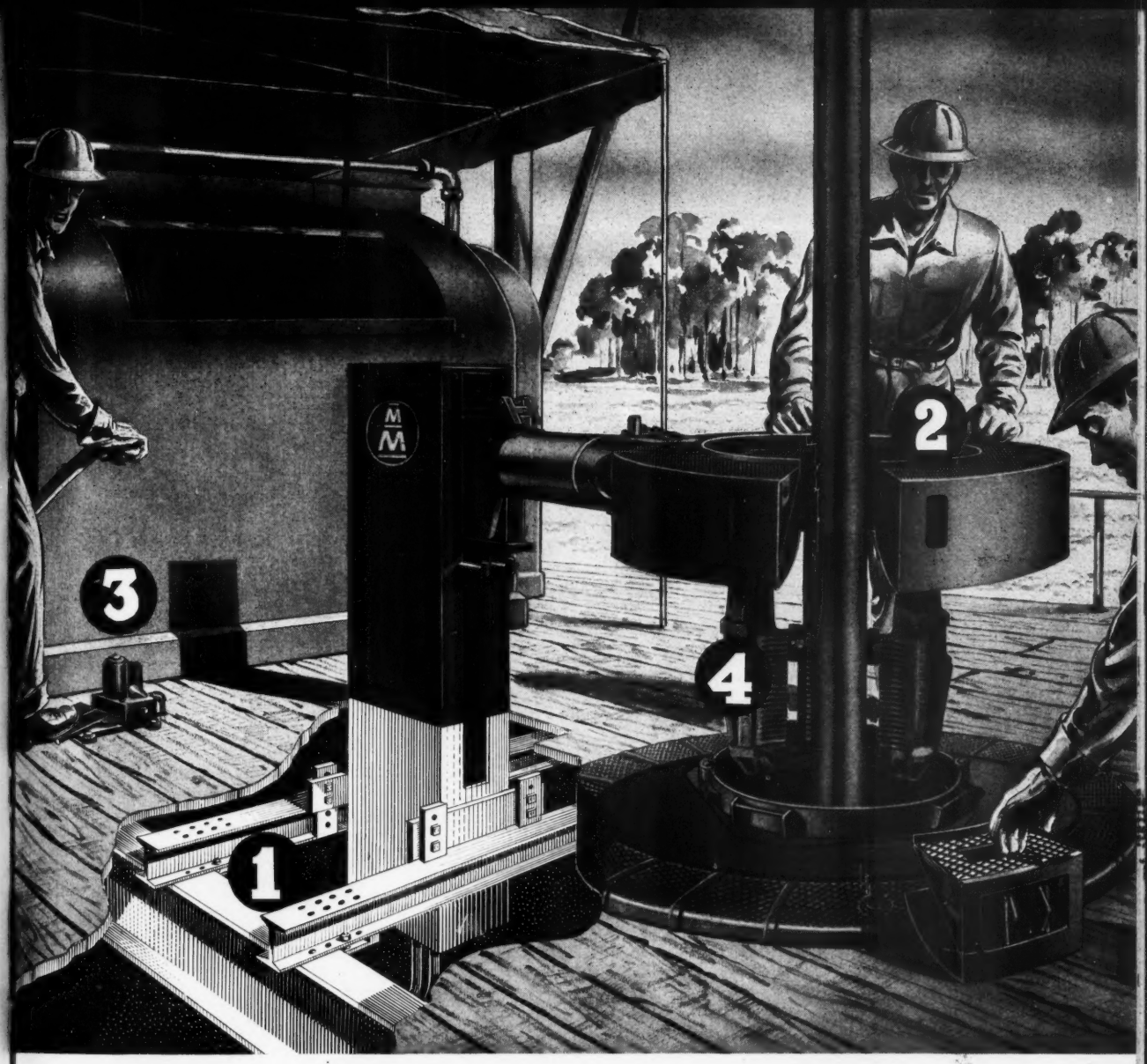
Dehydration of the gas takes place between the first and second stages of compression, and is accomplished by passing the gas through a column containing one flourite and three activated alumina beds. There are two of these columns operating in alternate 24-hour periods, one being reactivated while the other is in use. The columns are reactivated by cycling preheated gas through them to take up the water vapor from the beds, and then cooling the gas and collecting the resulting condensate in a receiving tank for removal from the system. Gas in the system is dehydrated to a dew point of 14° F. below zero at the discharge pressure of 1,825 psi.

The plant is semiautomatic, and ordinarily only one man is needed on each shift. An electrically operated emergency shutdown system has been provided. Switches have been placed

*Early gas development.—Producers & Refiners Corp. completed the first productive well in the field in September 1921 in the Muddy sandstone of Upper Cretaceous age, at a depth of 3,435 ft., for an initial production of 42,000,000 cu. ft. of gas per day. In 1922 gas pipe lines were laid to Casper and to Parco, Wyo. In September 1937 the pipe line was discontinued and the gasoline plant was dismantled at which time 61,000,000,000 cu. ft. of gas had been produced from the seven Muddy, Cloverly, and Sundance gas wells drilled in the field. Of this volume of gas 800,000,000 cu. ft. were produced from the Frontier formation, 34,200,000,000 cu. ft. from the Muddy sandstone, 24,000,000,000 cu. ft. from the Cloverly, locally called Dakota, and 2,000,000,000 cu. ft. from the Sundance formation.



Graphs of important data on production and injection rates. Gas is injected at a rate which will stabilize the reservoir pressure at about 2,140 psi.



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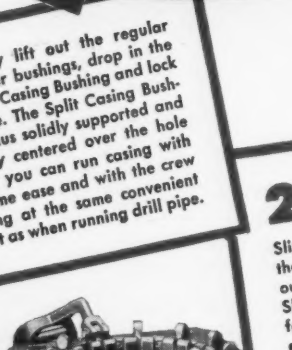
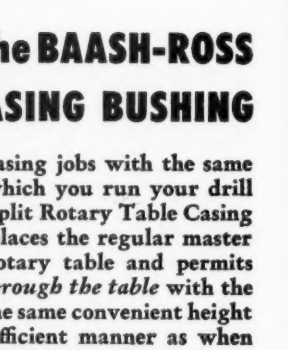
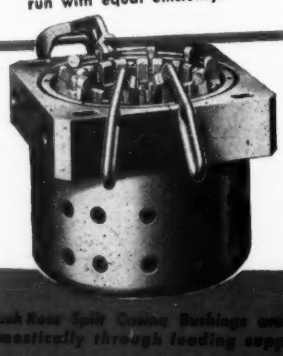




3 For smaller sizes of casing, drop in a split and hinged Slip Adapter which is tapered on both sides and sets flush with the top of the Casing Bushing. Removable handles permit quick and convenient insertion of the split and hinged Slip Adapter.

4 With the Slip Adapter in place, Baash-Ross Type "UC" Casing Slips to fit smaller sizes of casing can be set directly into the tapered bore of the Slip Adapter, thus permitting a wide range of casing jobs to be run with equal efficiency.



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at three convenient points in the plant and yard and pulling any one of these cuts off the fuel to the boiler, quenches the boiler fire boxes with steam, shorts the magnetos on the engine, shuts off the incoming gas, and turns all production through the separators direct to storage instead of through the plant.

Production of both oil and gas is delivered directly to the plant. The crude oil is passed through two banks of oil-to-oil heat exchangers and a steam heater to a flash tower is cooled, first in the heat exchangers with the incoming cold crude and then in the final water-to-oil cooler from which it goes to storage. Approximately 70 per cent of the gas produced with the oil is taken off at the oil and gas separators. The remaining gas is vented from the flash tower in the stabilization of the crude and is delivered with the gas from the separators to the intake of the low-stage compressors. This method prevents any loss of oil vapors by evaporation, and the gravity of the oil is increased in the stabilization process. The light gasoline fractions obtained in the gas compression are added to the oil stream as it goes to the tanks.

Pressure-Maintenance Operation

Until gas injection into the Tensleep sandstone was started, a free gas cap was not present in the reservoir. The oil was undersaturated with gas. The original gas-oil ratio was 210 cu. ft. per barrel of oil. By progressive control in high-structure wells as their respective ratios increased, the average gas-oil ratio has been held within reasonable limits, thus avoiding the necessity of handling excessive volumes of gas.

The volume of gas produced from the Tensleep formation is not sufficient to maintain desired formation pressure, consequently gas from the Cloverly and Sundance sand wells is used to make up any deficiency in volume needed to maintain volumetric balance in the reservoir.

It is estimated that there are 5,442,800,000 cu. ft. of gas in the gas in the gas cap on top of the structure as of December 31, 1948. Although 7,043,600,000 cu. ft. have been injected, 1,600,800,000 cu. ft. of that volume is gas that has been recycled in the process of production and reinjection. Average pressure at this time is 2,140 lb., which is 190 lb. over the low of 1,950 in 1942.

Two injection wells were used for a time but at present only one well is used. The original well is located on top of the structure, while the second well, now discontinued, is located about 250 ft. downstructure. The downstructure injection of gas was somewhat of a departure from general practice in the early history of a pressure-maintenance program. It was thought that by downstructure injection, gas would have an opportunity to saturate the undersaturated oil with gas in its movement upstructure, and in so doing reduce the viscosity of the oil and stimulate its movement to producing wells. However, it was found that eventually the gas injected in the downstructure well channeled to adjoining wells and its use was discontinued.

The volume of gas injected has been guided by the rate of oil withdrawal. It is calculated that 3,000 bbl. of water per day move upstructure to replace oil withdrawn at a reservoir pressure differential of 460 psi. (based on a volumetric balance of fluids produced as against fluids in place in the reservoir). The water head is equivalent to 2,600 psi. as indicated by reservoir pressure prior to oil withdrawal. Therefore, when oil is produced at a rate in excess of 3,000 bbl. per day, an equivalent volume replacement in the reservoir has to be made by gas injection in order to stabilize the reservoir somewhere near 2,140 psi. (see graph). A minimum of 2,000 psi. reservoir pressure is required to maintain flow of the wells, and it is therefore important that the reservoir pressure be maintained at some pressure in excess of 2,000 psi. It is estimated that 1,200 cu. ft. of gas is required to replace 1 bbl. of oil under reservoir conditions. This estimate is based on bottom-hole samples and field tests made by the unit operator.

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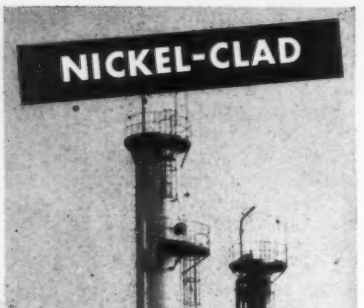

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PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Welding Progress

TWO papers presented before the American Welding Society at its annual meeting in Philadelphia, October 25-29, are of some interest to the petroleum industry. A complete set of abstracts of the many welding papers is found on pages 99-101 of the November 1948 issue of Materials and Methods.

Welding High Temperature Alloys

Where severe service conditions are encountered much can be learned about the metals by studying those that failed in service. M. E. Holmberg's paper, "Use of Alloys and Welding in High-Temperature Service in Oil and Gas Processing," was based on the study of failures in welded alloy structures used in the oil industry. From his studies, he found that where corrosion is not an important consideration, stabilized material is not required even though 18:8 is welded and exposed in service in temperatures within the carbide precipitation range of 800° to 1,500° F.

Ferritic materials, such as 5 per cent chromium-molybdenum, 12 per cent chromuim-molybdenum, 12 per cent chromium, etc., cannot always be successfully welded with austenitic rods. Where such welds are subjected to many great changes in temperature, due either to frequent shutdown or cyclic operations, cracks develop as a result of differences in the coefficients of expansion of the austenitic and ferritic materials, and in some cases, because of the difference in thermal conductivity.

Powder Cutting of Stainless Steels

With the widespread application of the powder-cutting process for cutting stainless steels, there has been great interest in the effects of the process on the corrosion resistance of the steels, and whether the effects can be corrected by suitable annealing or modifications of the cutting procedure. C. R. Bishop and L. E. Stark investigated these problems. Their paper, "Corrosion Resistance of Powder-Cut Stainless Steels," discusses the condition of the kerf and heat-affected zones of powder-cut edges in stainless steels, the welding of the powder-cut beveled edges, and the minimizing of heat effects by means of water-quenching applied simultaneously with the cutting operation.

Tests were performed to compare the effects of powder cutting on a variety of unstabilized and stabilized types of stainless steels. The results were based on corrosion studies and metallographic examinations of powder-cut specimens. The zone adjacent to the cut face, which is chemically altered by the powder-cutting process, is not more than 0.03 in. thick, and this zone can be removed by superficial grinding. Preparation of beveled plates of unstabilized stainless steels by powder cutting does not increase the severity of the heat-affected zone when subsequently welded by manual arc or submerged melt methods.

Nitrogen Additions to High Alloy Steels

WITH the present tight nickel supply, it is timely to consider the possible substitution of nitrogen for part of the nickel in austenitic steels. In this country, nitrogen has been added to the high-chromium ferritic steels, but little attention has been paid to the addition of nitrogen to austenitic steels. H. Schottky, in the April 1948 issue of Zeitchrift fur Metallkunde (German), summarizes the German work, which was carried out with the aim of saving nickel and improving the properties.

The addition of about 0.2 per cent nitrogen made it possible to decrease the nickel in "18 : 8" to about 4 to 5.5 per cent and still to retain an austenitic structure. Nitrogen additions were made to other austenitic steels, including both chromium-nickel and chromium - manganese steels. In austenitic and austenitic-ferritic steels, the nitrogen increased the 0.2 per cent yield strength markedly and, to a lesser extent, the tensile strength with little change in the working properties. The hot, tensile strength was also increased.

The nitrogen had little effect on the scale resistance, embrittlement on long holding at elevated temperatures, weldability, or general corrosion resistance. Improved resistance to pitting, however, was shown by a steel with 23 per cent chromium, 4 per cent nickel, and nitrogen, which was one of the suggested substitutes for 18 : 8. The creep strength was considerably improved in special cases by the further addition of elements, such as vanadium, which combined with the nitrogen to cause precipitation hardening.

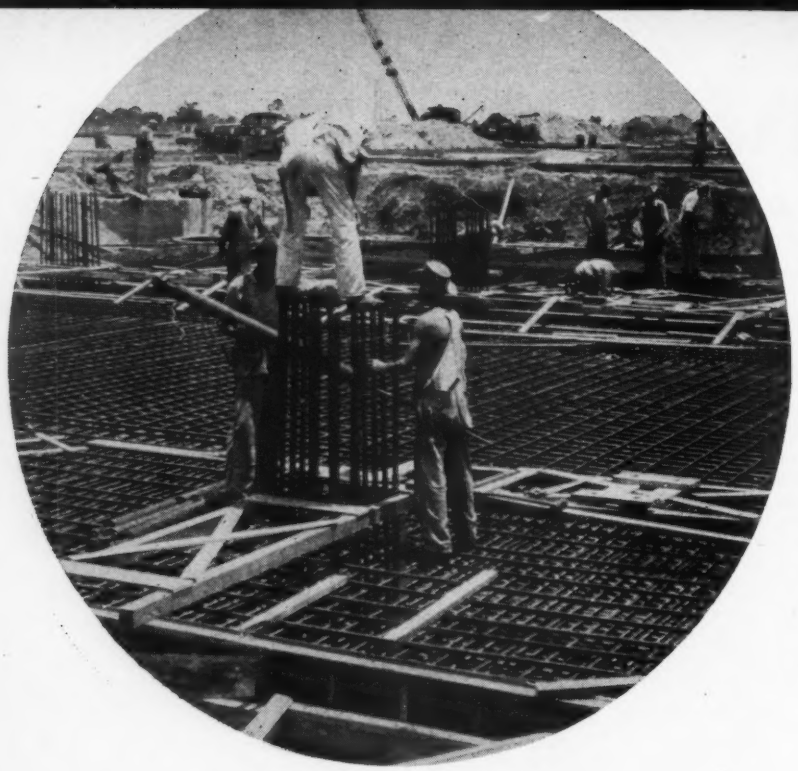
An abstract taken from Materials and Methods, October 1948.

TEMPERATURE STABILITY OF ALLOYS

STABILITY OF ALLOYS TO OXIDIZING ATMOSPHERES

Maximum temperature (°F.)	Kind of material—	Percentage of element, approx.* Cr	Ni	Al	Mn	Si	C
840	Copper	.....	.....	.....	.....	.....	.....
930	Iron	.....	.....	.....	.....	.....	.....
1,200	Iron-chromium alloy	4-6	.....	.....	0.5	0.5	0.1-0.2
1,290	Brass	.....	.....	.....	.....	.....	.....
1,380	Iron-chromium alloy	8-10	.....	.....	0.5	0.5	†0.15
1,380-1,470	Iron-chromium alloy	12-14	.....	.....	0.5	0.5	†0.10
1,470	Nickel	.....	100	.....	.....	.....	.....
1,470	Chromium-aluminum-iron alloy	5-6.5	.....	0.6-0.8	0.45	0.5	0.10
1,560-1,650	Iron-chromium alloy	16-18	.....	.....	0.5	0.5	0.10
1,560-1,650	Iron-chromium-nickel alloy	17-19	8-10	.....	0.5	0.5	0.10
1,650	Chromium	100	.....	.....	.....	.....	.....
1,650	Iron-chromium-aluminum alloy	6.5-8.5	.....	1.2-2.0	0.45	1.0	0.10
1,650-1,830	Iron-chromium-aluminum alloy	12-15	.....	2.5-3.5	0.5	0.5-1	0.12
1,830	Iron-chromium-nickel alloy	22-28	12-16	.....	0.5	0.5	0.15
1,830-2,010	Nickel-chromium-iron alloy	14-18	60-65	.....	1-2	1.5-2	0.5
1,920-2,010	Iron-chromium alloy	25-30	.....	.....	0.5	0.5	0.10
1,920-2,010	Iron-nickel-chromium alloy	17-19	25-26	.....	0.5	†3.0	†0.20
1,920-2,010	Iron-chromium-nickel alloy	24-26	19-21	.....	0.75	1.0	†0.15
1,920-2,010	Nickel-chromium-iron alloy	15-20	30-35	.....	0.5-1	1-2	†0.15
2,010-2,100	Nickel-chromium alloy	12-20	70-80	.....	2	2	0.15
2,100	Nickel-chromium alloy	19-20	77-79	.....	2.5	0.5	†0.25
2,190	Chromium-aluminum-iron alloy	18-20	.....	3-4	0.5	0.5-1	0.12
2,100-2,370‡	Chromium-aluminum-cobalt‡-iron alloy	20	.....	5	.....	.....	.....
2,280-2,370	Chromium-aluminum-iron alloy	20-22	.....	3-5	0.5-1.5	0.5	0.10
2,460 approx.	Chromium-aluminum-iron alloy	30	.....	5	0.5	0.5	0.10

*Rest primarily iron. †Maximum. ‡Cobalt 1.5-3 per cent.



View showing formwork and reinforcing steel for the reactor-regenerator foundations, Shell's Deer Park, Tex., refinery (July 1945). The first 15 ft. of the soil is composed of yellow sandy clay. The foundation slab was laid 4½ ft. below grade into this layer. Next 45 ft. underneath was red clay, then 6 ft. of sandy clay. The latter was underlaid by sand

This article deals with certain phases of soil mechanics and covers a number of the factors to be considered in construction of foundations for heavy refining and other plant equipment. Specific data are included for the Gulf Coast area, as obtained during the site selection and erection of heavy fractionators and cat cracking equipment in Shell's Deer Park (Houston) refinery.

Edwin L. Green, the author, is project engineer, construction department, Houston refinery, Shell Oil Co., Inc. Green is a graduate of Louisiana State University with B.C.E. and M.S. degrees. He joined the Shell organization in July 1936. During the war he served in the Corps of Engineers, U. S. Army, and was returned to inactive status February 1946 with the rank of colonel.

Foundation SETTLEMENT ... in the Gulf Coast Area

by Edwin L. Green

THE design or construction engineer is accustomed to dealing with steel or reinforced concrete, both of which possess fairly constant and well-defined properties. The soils or ground basements that all physical structures must be built upon, however, do not always possess similar constant or well-defined qualities. Studies show that foundation soils react differently to loads and present the engineer with another type of problem. In foundation work, except in high earthfills where land slides are a problem, abrupt failure is not to be anticipated and resistance to rupture is not an important consideration. Instead, the problem in the heavy-construction field is usually one of settlement which may cause damage to structures or equipment when certain allowable soil limits are exceeded.

The United States Bureau of Public Roads has grouped subsurface soils into eight divisions from A1 to A8 inclusive, based upon the presence of soil constituents, physical properties, and performances. While this grouping was set up primarily for road work, it can also be used for heavy foundation work in the industrial field.

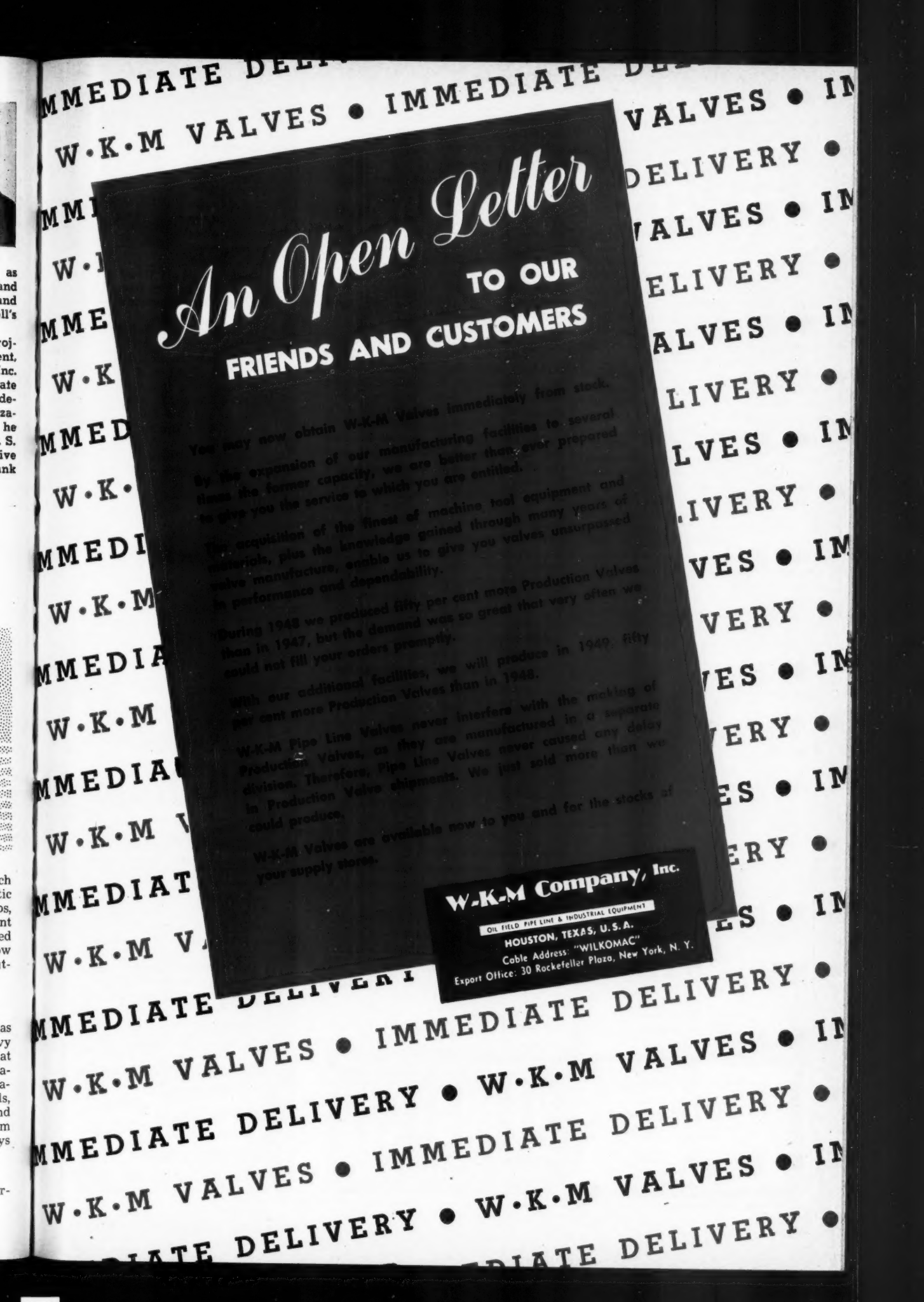
The best grade of foundation soils belong to the A1 to A4 groups inclusive. The less-plastic varieties of the A6 and A7 groups are next best, and the soils of the A5, A8, and the more plastic varieties of the A6 and A7 groups are the soils that usually require special treatment.

The lateral flow of soil, in addition to vertical settlement, is quite a serious problem. Therefore, in the case of abutments or retaining walls, often both settlement and lateral flow of soils must be considered. Consequently in the design of such structures for use on the softer soils such as the A8 group and the more plastic varieties of the A6 and A7 groups, provisions must be made to prevent the structure from being displaced laterally when surcharge causes flow of the soft undersoil toward an outcrop around a stream or lake.

Subsoil Surveys

Subsoil surveys are considered as necessary today on all types of heavy construction as the land survey that precedes actual construction operations. The founding of heavy foundations, the location and design of fills, the stabilization of soils, all depend upon the information derived from the subsoil survey. Such surveys usually consist of three parts:

1. Determination of soil profile.
2. Selection of samples for deter-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mination of physical properties of soils included in profile.

3. Mapping of soils to supply information important to design.

Foundation Soils of Texas Gulf Coast Area

The coastal plain of the Texas Gulf Coast from the Sabine River to the Corpus Christi area is composed of weathered outcrops of the Beaumont clay and the Lissie formation of Pleistocene age. The Beaumont clay terrace outcrops nearest the coast, forming a band which extends inland for a distance of 50 or more miles. The Beaumont clay of the Gulf Coast area belongs to the A6 and A7 groups of the U. S. Bureau of Public Roads scale. There is no clear-cut distinction between the two groups in this area, but rather a blending of the two.

The Beaumont clay is made up of layers of clay, silt, and sand, with the clay predominating. This clay varies from plastic to hard and brittle; some strata are very high in clay minerals while others are very silty or sandy. The sand strata are composed of fine to very fine clean silica sand. Strata of silt are not as common as sand and those that do occur are without cohesion, inorganic, and low in density.

The weathered surface soils of the Beaumont clay formation are composed of active clays, which swell and shrink according to cycles of the weather. This surface clay will alternately be softened by saturation and hardened by the sun to a depth of several feet.

Rock is not found near the surface anywhere in the Gulf Coast region, except for small concretions of calcium carbonate in the clay strata and occasionally thin seams of siltstone in the silt strata.

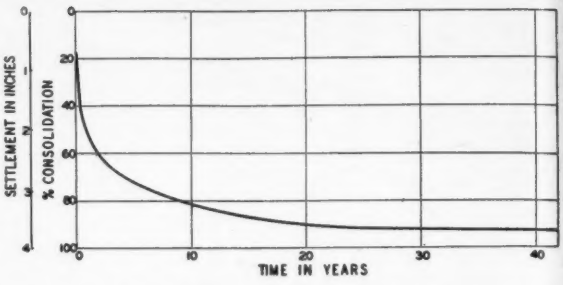


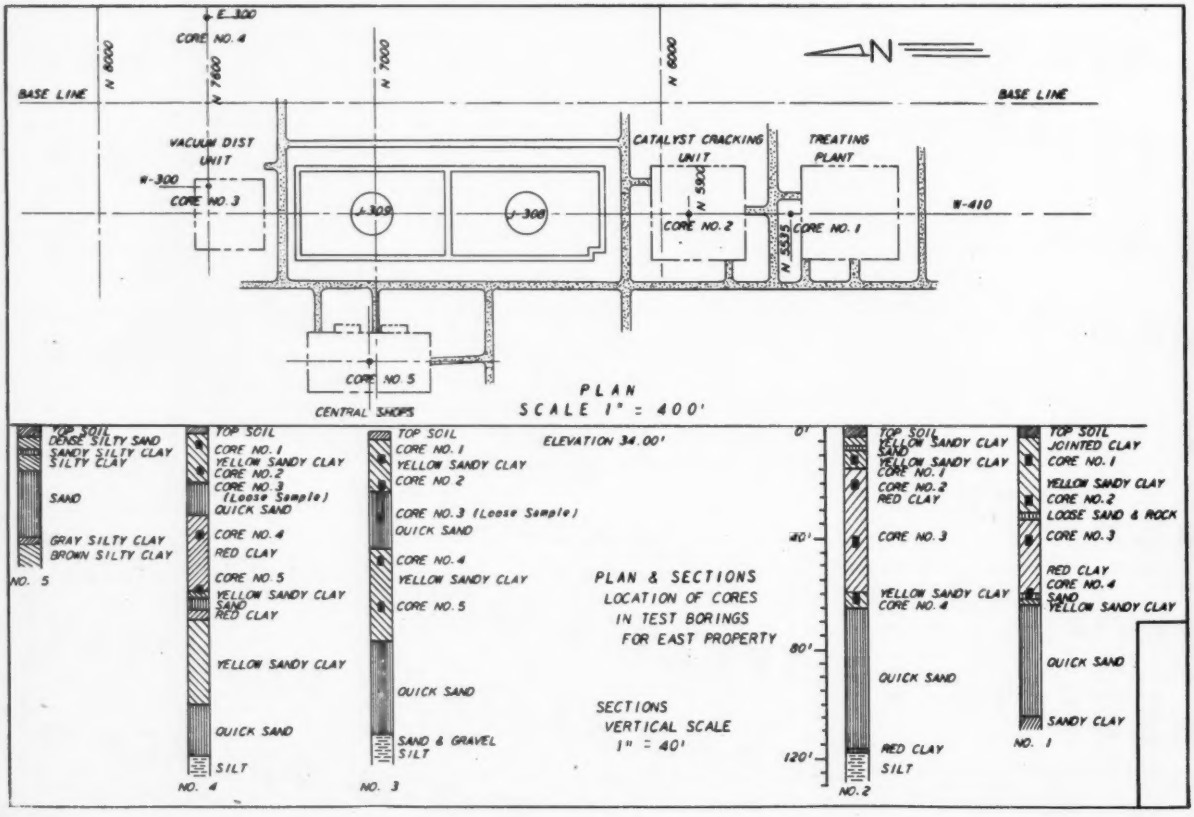
Fig. 2—Theoretical time settlement curve

It is common practice in the Houston area for many light structures to be erected with foundations in the upper softened layer of clay. However, such is not good practice as is evidenced by the numerous cracks in brick and plastered walls. Five to ten feet minimum of excavation in the Houston area is usually required to reach suitable soil. Excavations for heavy foundations should be sealed off with several inches of concrete when grade is reached in order to prevent the shrinkage of the clay during the dry season, or the softening of the top several inches of clay during the rainy season.

Use of piling in the Beaumont clay has been a much-debated question. Pile foundations are expensive and quite often add unnecessarily to the cost of the structure. Many of the engineers in the Gulf Coast area believe that the use of piling in the Beaumont clay merely aggravates a bad condition, as the piling tends to hasten the softening of the clay which will accelerate settlement of the structure.

The problems concerning settling differ depending on whether the foundations are for piers or footings, abutments, or embankments. The allowable settlement for the particular structure having been decided upon, and the compressible characteristics of the undersoil determined, it is only necessary to compute the required size of footing. If the footing of the required size cannot be used, several possibilities are open whereby the size of the footing might be reduced: (1) piling might be driven to rock or

Fig. 1—Location and log of test boring



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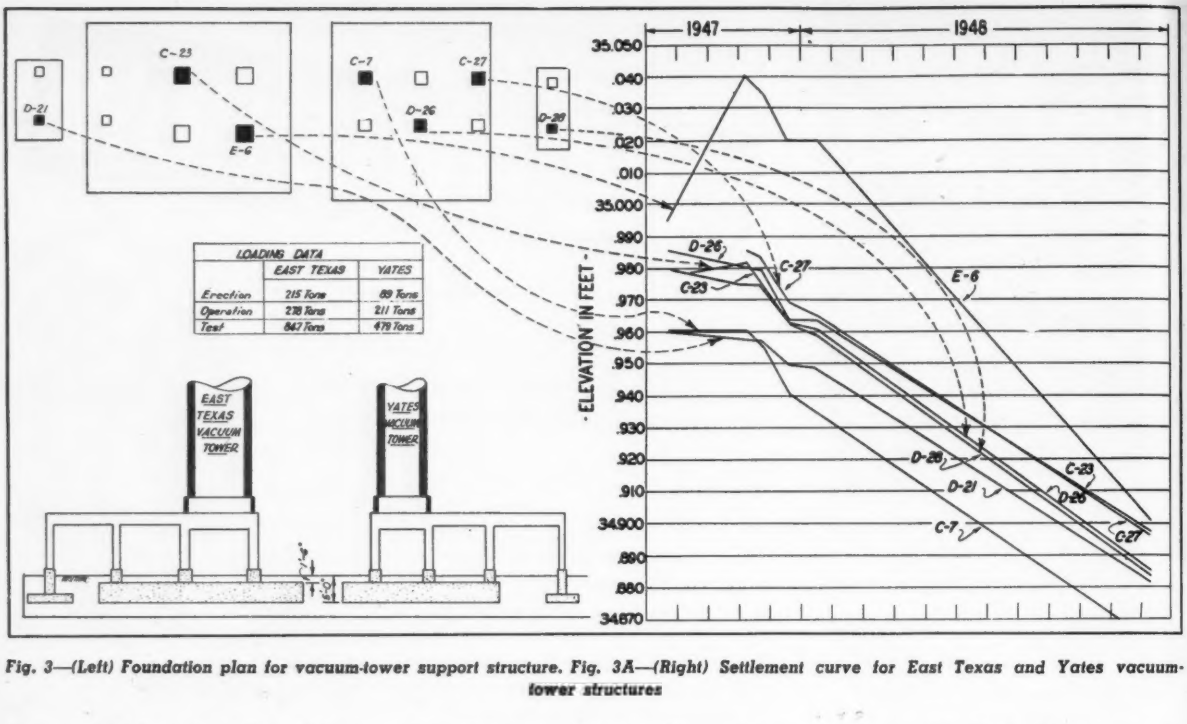

Fig. 3—(Left) Foundation plan for vacuum-tower support structure. Fig. 3A—(Right) Settlement curve for East Texas and Yates vacuum-tower structures

firm undersoil or in soils which are not reduced in bearing value by their use. Piles need not extend to a rock strata to be of value, as a "pressure bulb" will be developed under each piling which will thus reduce the stress immediately under the footing, and (2) the use of some sort of injector method in which piling may or may not be used.

Foundations at Shell's Deer Park Refinery

The foundation soils at Shell's Deer Park, Tex., refinery are Beaumont clay. Borings at the site revealed favorable foundation conditions. Quicksand was encountered 60 to 70 ft. below the surface. It did not prove troublesome, however, due to the depth and confinement. Locations of borings and core drill logs are shown in Fig. 1.

A stratum composed of gray and yellow silty clays, 10 to 15 ft. in thickness, was found at the surface over the entire area. Such soil, while soft at the immediate surface, is strong enough to support heavy foundation loads at a depth of 5 ft., and becomes increasingly stronger with depth.

A sandy stratum was encountered between 15 and 30 ft. in almost every boring. This layer graded from a mixture of sand, silt, and clay a few inches in thickness to fairly clean sand 20 ft. in thickness. There was no evidence of flowing water in this sand stratum.

It is a well-known fact that the clay in this area will consolidate under pressure, causing settlement; therefore foundation problems resolve into knowing the foundation load, and determining the maximum amount of predicted settlement as well as the amount of differential settlement. The differential settlement in itself is of far greater importance than the total predicted settlements. The settlement calculations involved in foundation investigations are relatively simple. A brief discussion of what was involved in the investigations at Deer Park is offered as a matter of information.

Procedure for these calculations is as follows:

1. Computation of vertical pressures that would be created at various depths below surface by the proposed structure.

2. Making of consolidation tests on undisturbed core samples representative of foundation materials.

3. Computing amount and rate at which settlement would occur.

Vertical pressures. — The pressure produced at various depths caused by the weight of the structure was computed by the graphical method devised by Prof. Newmark of University of Illinois, based on the Boussinesq equation for the distribution of a vertical load in an elastic medium.

Consolidation tests. — Testing procedure was essentially as described in "Notes on Soil Testing for Engineering Purposes" by Fadum and Casagrande of Harvard University. During the loading operation, the amount of consolidation was plotted against time on semilog paper, in order that it might be certain that the test had gone well into the secondary consolidation before increasing the load. Typical computation data are not included in this article, but were prepared in the laboratory of the consulting engineer for each sample, and they gave the final degrees of saturation and final voids ratio under each increment of load, as well as the coefficient of compressibility. The coefficient of compressibility is defined as the rate of change in the voids ratio to change in pressure.

Amount and rate of settlement.— Settlements can be calculated from voids ratio-pressure curves and vertical pressure profiles. The soil should be divided into layers and the types noted for each.

Sand consolidates very quickly so that practically all of the settlement due to the sand will take place during construction and will contribute nothing to differential settlement. This theory is based upon the supposition that the quicksand strata will not become exposed or drained in any way. Any load removed due to excavation may be replaced without causing settlement, if the soil has completely consolidated under the overburden. Therefore, the weight of the excavated soil may be deducted from the weight the footing exerts on the soil, since that portion of the load causes no settlement.

The rate of settlement of loaded layers is dependent on three factors: thickness of layer, number of faces free to drain, and the distribution of active pressures. From the theory of consolidation, it is known that the rate of settlement of two layers of the same material, but of different thicknesses, varies directly as the square of the thickness.

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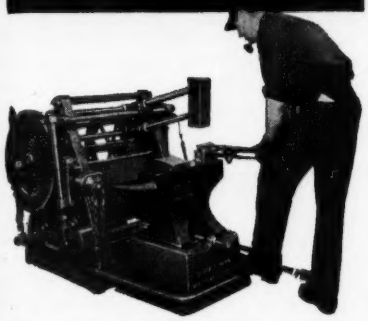

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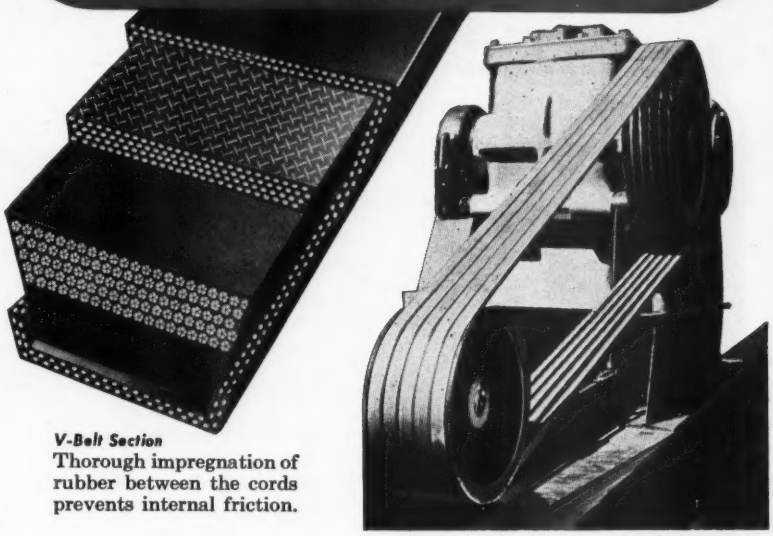

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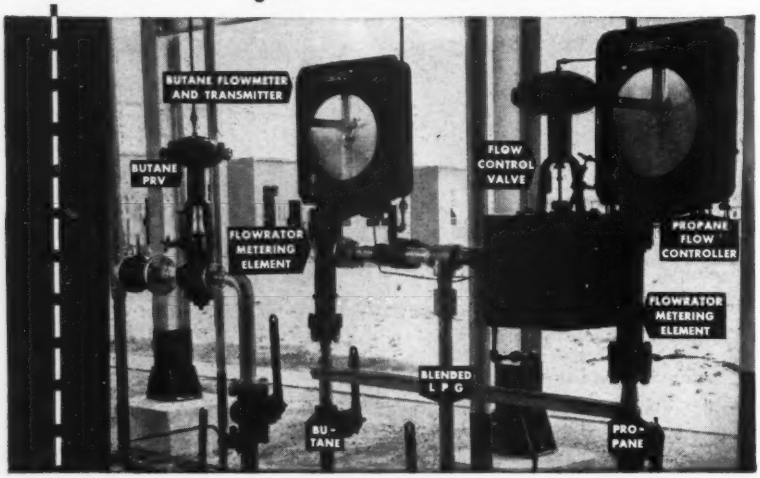

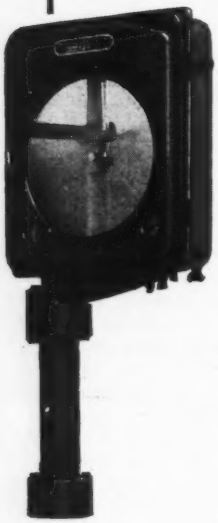

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INSTRUMENTS FOR FLOW MEASUREMENT AND AUTOMATIC CONTROL

at the Deer Park project, was estimated at 2,900 tons. Foundation loading under the foundation was limited to 2,500 lb. per sq. ft. bearing and 3,000 lb. per sq. ft. toe load. The wind load was based on a 125-mile wind with a load of 52 lb. per sq. ft. on flat surfaces and 40 lb. per sq. ft. on projected surfaces. The weight of the vacuum tower (East Texas crude) when in operation is 278 tons, and the other tower (Yates crude) is 211 tons. The allowable soil bearing was 2,000 lb. per sq. ft. and 2,500 lb. per sq. ft. toe load. Wind loads for the towers were 40 lb. per sq. ft. for flat surfaces and 30 lb. per sq. ft. for curved surfaces.

Unconfined compression tests on the clays in the cat cracker area indicated a probable angle of internal friction of 15° and a cohesion of 640 lb. per sq. ft. If the softest clay is assumed under the worst conditions, where the angle of internal friction is 0°, the value of cohesion would be 950 lb. per sq. ft. The ultimate bearing capacity can be solved by the logarithmetic spiral method (Terzaghi's "Theoretical Soil Mechanics") using an angle of internal friction of 15° and a cohesion of 640 lb. per sq. ft., which gives an ultimate bearing of 11,200 lb. per sq. ft. Using the lesser values given above for the angle of friction and for cohesion, results in an ultimate bearing of 5,100 lb. per sq. ft. It must therefore be concluded that the soil in question has adequate bearing capacity to support loads greater than those specified in the proposals.

Time Settlement Curves for Reactor Regenerator Foundation

The theoretical time settlement curves in this case were based on a bearing of 2,000 lb. per sq. ft. Average settlement for the reactor regenerator foundation was estimated to be 2¾ in. for the first 3 years (see Fig. 2) whereas the actual settlement has been only 1¼ in. However, over a period of several years, the calculated time settlement curves would probably more closely approach each other. The total maximum predicted settlement over a period of 25 years is approximately 3¾ in. Another interesting point: it is entirely possible that the bench marks on which the check elevations are based may actually be varying with seasonal changes. The bench marks in the catalytic cracking area are set in the upper stratum of the Beaumont clay, approximately 5 ft. below normal ground level. Two deep bench marks of 26 ft. in depth have recently been set in the cat cracker area, which should improve the accuracy of all future data.

Time Settlement Curves—Vacuum Distillation Unit

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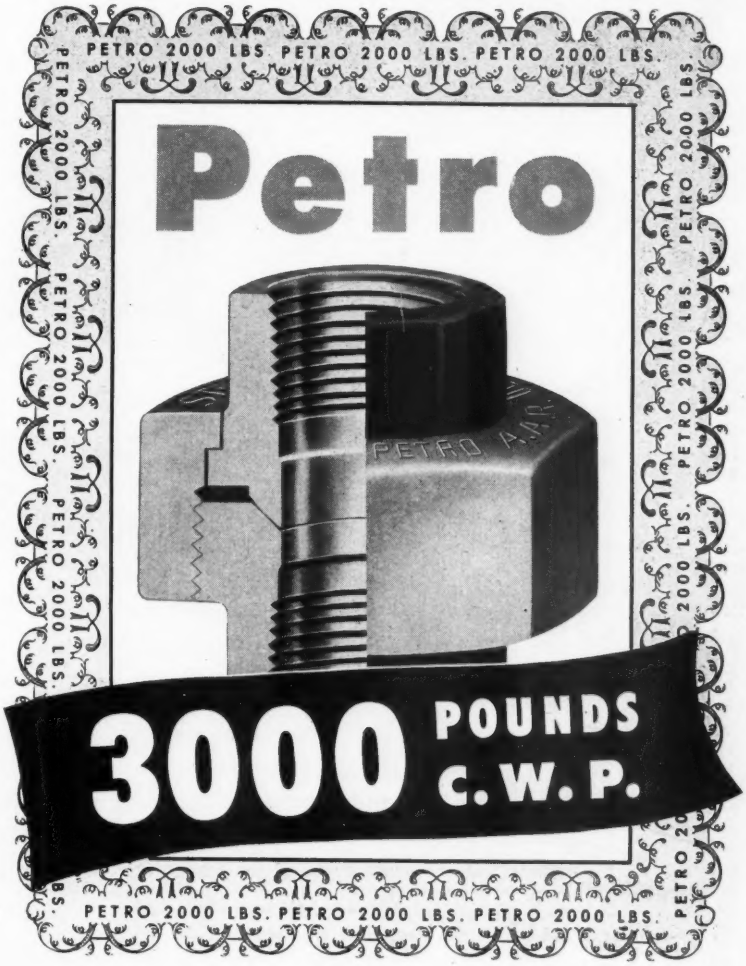

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however, a record is being kept of actual settlement at designated points on the foundation plan shown in Fig. 3. The actual settlement curves are shown in Fig. 3-A. The maximum settlement to date is 1¼ in. at a point under the vacuum tower (Yates crude). The test loading of the two towers produced considerably more loading on the foundation than will actually be experienced under normal operating conditions.

Foundation studies of the catalytic cracking unit site were made by Prof. Raymond F. Dawson of University of Texas and his recommendations were closely followed in all design procedure. Later studies of adjacent areas were made by Greer and McClelland, consulting engineers of Houston. The site of the Shell Refinery on the coastal plain has an elevation of approximately 34 ft. above sea level.

Conclusions—General

The size and type of the construction project must be considered when planning any program of soil exploration. A small number of exploratory borings may suffice if the proposed program involves a small expenditure of money; however, it must be realized that the lack of accurate information concerning subsoil conditions is usually taken care of by a liberal factor of safety in design. Where large-scale construction operations are planned, the engineer will find that the cost of a complete subsoil investigation is small when compared to the possible savings that can be effected in design.

Adequate bench marks should be set deep enough so as not to be affected by any movement of the upper crust of the clay. The bench marks used to set the foundation, and later used as check bench marks, should be set outside of the disturbed area.

A brass marker should be set in the concrete column base or a mark stenciled on the steel base plate for a permanent point. Readings should be taken on these points monthly during the period of construction, perhaps quarterly for a period of a year following the completion of construction, and thereafter at least once a year. This procedure would produce an actual time settlement curve which could be checked against the predicted settlement data of the soils consultant, and would be invaluable to the design engineer as well as the soils engineer.

Conclusions—Gulf Coast

The Beaumont clay can be disturbed by wetting and drying action, as well as by manipulation. For this reason, the foundation slab should be poured immediately after the excavation is completed. If this is not possible, a seal coat should be poured, or the final several inches of soil should not be removed until just prior to the concrete pour.

Disturbance of the Beaumont clays reduces their bearing capacity and tends to increase consolidation. Therefore, all structures should be placed on undisturbed soil. The use of piles in clays of this character is questionable, as it is believed that the piling merely disturbs the clay and possibly accelerates the settlement of the structure, or adjacent structures. The possible exception might be when the pile is driven through a soft upper stratum to rest in a lower stratum that is hard and well compacted.

Clays of this type will swell, and exert great pressure when such occurs. Therefore, this clay should not be used on backfill against retaining walls, floor slabs, etc.

Appendix

Readers interested in the testing phases of this subject can refer to the following brief descriptions and definitions of the various physical tests variously involved. Other references on testing appear in the literature published on soil mechanics by the United States Bureau of Public Roads.

Shearing tests. — These are: (1) direct shear, (2) tri-azial shear, and (3) unconfined compression. Only the latter will be discussed. The unconfined compression test, similar to a compression test performed on concrete cylinders, is made by applying an axial load to cylindrical cores or prepared samples and measuring the deformation corresponding to the stress as the load is increased. When the stress reaches the ultimate limit, the sample may fail either by a gradual bulging or a sudden rupture. The ultimate strength of a test specimen, prepared from an undisturbed sample with an unaltered water content, is a relative measure of the ultimate bearing capacity of a soil.

Consolidation test. — Performed for the purpose of determining the total volume decrease as well as the time rate of volume decreased which a laterally confined soil sample will undergo when subjected to an axial load. This test enables one to estimate the ultimate settlement to be encountered in soft saturated soils when loaded, and the rate at which settlements will take place.

Permeability test.—Performed on soils to determine the coefficient of permeability, which may be defined as a measure of the amount of water which will percolate through a unit cross section of a soil in a unit of time under a unit hydraulic gradient.

Physical Test Definitions

Liquid limit.—Measure of moisture content of the soil sample, or limit at which the soil will float when slightly "jarred."

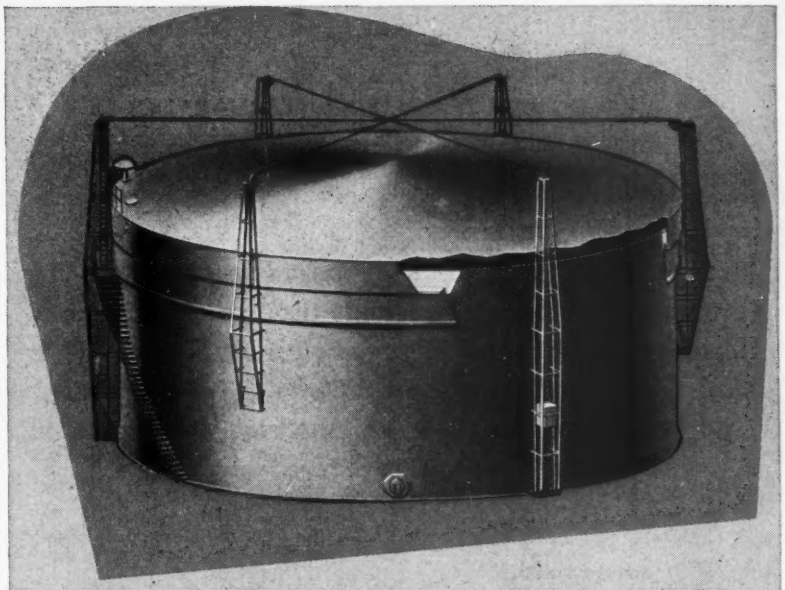
Plastic limit.—Lowest moisture content at which the soil will remain plastic.

Plasticity index. — Numerical difference between the liquid and plastic limits, showing the range in moisture content through which the soil will remain plastic.

Shrinkage limit. — Moisture content at which further evaporation of moisture does not produce further decrease in volume of the soil.

Moisture equivalents.—These tests indicate compressive properties of soils. (1) The centrifuge moisture equivalent test is a measure of the compressive properties of the soil. (2) The field moisture equivalent test is a measure of the expansive properties of the soil.

Mechanical analyses of soils.—Determines the size and grading of the particles. Sieves numbers 20, 40, 60, and 200 are used in the analysis. Those particles retained on a No. 200 sieve are subjected to sieve analysis, whereas those passing the No. 200 sieve are analyzed by the hydrometer method. This method of grain analysis is based upon the fact that particles of equal specific gravity settle in water at a rate which is proportional to their size (Stokes law).



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DIGESTS

A.I.M.E., SAN FRANCISCO, FEBRUARY 13-17

Summaries of the technical papers presented at the annual meeting of the American Institute of Mining and Metallurgical Engineers, held February 13-17, 1949, in San Francisco. The papers "Wertz Field Unitization" and "Induction Well Logging" appear in this issue on pages 149 and 168, respectively.

Steady States in Single-Phase Reservoirs

E. R. BROWNSCOMBE and FRANCIS COLLINS, The Atlantic Refining Co., Dallas.

THE study deals primarily with the pressure and flow rates from a closed reservoir which has been produced from a centrally located well long enough to establish steady flow rates and pressure gradients. It applies particularly to undersaturated reservoirs. When there is a substantial spread between reservoir pressure and saturation pressure, the time necessary to set up such steady state rate and gradient conditions may be small compared to the time the field will produce before a substantial part of it reaches saturation pressure.

The well-known radial-flow equation gives the pressure distribution at various distances when the total flow into a well comes from an area beyond these distances. In a closed undersaturated reservoir, production is by liquid expansion and after a short time all parts of the reservoir are expanding at the same rate and contribute to the flow in proportion to their volumes. The pressure and flow-rate distributions are obtained for this condition, and the analysis includes the more general case of a fixed flow into the reservoir which is an arbitrary fraction of the constant production rate from the well.

It is shown, for example, that the drawdown which determines well productivity is only slightly affected by the amount of flow across the outer boundary. For a given flowing well pressure, however, the final build-up pressure may be substantially different for a closed reservoir from one having a constant pressure at the outer boundary. Among applications of the results are determination of initial conditions for detailed solution-gas-drive calculations, calculation of production from the area around a shut-in well by adjoining wells, and dynamic checking of the operation of electric analog oil-pool analyzers.

Application of the Laplace Transformation to Flow Problems in Reservoirs

A. F. VAN EVERDINGEN, Shell Oil Co., Inc., Houston, and WILLIAM HURST, consultant, Houston.

FOR several years the authors have felt the need for a source from which reservoir engineers could obtain fundamental theory and data on the flow of fluids through permeable media in the unsteady state. The data on the unsteady state flow are composed of solutions of the equation

$$\frac{\partial^2 P}{\partial r^2} + \frac{1}{r}\frac{\partial P}{\partial r} = \frac{\partial P}{\partial t}$$

or as it is written in shorter form,

$$\Delta^2 p = \partial p / \partial t.$$

Two sets of solutions of this question are developed, namely, for "the constant terminal pressure case" and "the constant terminal rate case."

In the constant terminal pressure case, the pressure at the terminal boundary is lowered by unity at zero time, kept constant thereafter, and the cumulative amount of fluid flowing across the boundary is computed, as a function of the time.

In the constant terminal rate case a unit rate of production is made to flow across the terminal boundary (from time zero onward) and the ensuing pressure drop is computed as a function of the time.

Considerable effort has been made to compile complete tables from which curves can be constructed for the constant terminal rate cases, both for finite and infinite reservoirs. These curves can be employed to reproduce the effect of any pressure or rate history encountered in practice.

Most of the information is obtained by the help of the Laplace transformations, which proved to be extremely helpful for analyzing the problems encountered in fluid flow. The application of this method simplifies the more tedious mathematical analyses employed in the past. With the help of Laplace transformations some original developments were obtained (and presented) which could not have been easily foreseen by the earlier methods.

Experiments on the Capillary Properties of Porous Solids

JOHN C. CALHOUN, JR., Department of Petroleum Engineering, University of Oklahoma; MAURICE LEWIS, JR., and R. C. NEWMAN.

REPORT is made of experimental work performed on the capillary retention of water within porous solid systems, the displacement being accomplished with air and various organic liquids. A portion of the experiments were designed to measure the lowering of vapor pressure of water within a porous solid with subsequent conversion of such vapor pressure data to capillary pressure values. The form of the capillary pressure curve at high capillary pressures has been elucidated from this data. Certain theoretical approaches are presented to indicate the correlation between work done by previous investigators. The present work is correlated also with theory. Surface-area values are calculated for the various core systems studied.

The experiments reported here lead to the conclusion that for the practical purpose of obtaining connate-water values by capillary pressure curves, caution should be used in choice of a displacing liquid. Experiments demonstrate the desirability of determining such values at a maximum pressure which is considerable distance above the capillary pressure plateau. From a strictly theoretical standpoint the experiments indicate that there is no "irreducible minimum" and that zero water saturation is reached at some finite value of capillary pressure.

The possible usefulness of vapor pressure measurements or adsorption data to give characteristics of porous reservoir materials has been outlined. Good agreement was obtained between capillary pressure data by displacement and that calculated from the vapor pressure data.

A New Compressibility Correlation For Natural Gases and Its Application to Estimates of Gas-in-Place

E. B. ELFRINK, C. R. SANDBERG, and T. A. POLLARD, Magnolia Petroleum Co., Field Research Laboratories, Dallas.

THE paper evaluates compressibility factor data and discusses their application to the estimation of gas reserves. A correlation is presented which provides compressibility factors for use in both two-phase and single-phase hydrocarbon systems. Accuracies comparable to those obtained previously for single-phase systems only can be expected. A simple means of predicting the presence or absence of a liquid phase in a condensate system of known composition is illustrated.

The correlation is based on 1,030 compressibility determinations from 21 hydrocarbon samples taken from 8 oil fields. Of the data used, 75 per cent were from California, 15 per cent from the Mid-Continent area, and 10 per cent were from South America. The average numerical deviation of the experimental data from this compressibility chart is 1.22 per cent.

Charts and tables are included and discussed which illustrate the errors involved through the misuse or nonuse of compressibility factors in estimates of gas-in-place.

Behavior of Binary, Ternary, and Multicomponent Systems at States Similar to Those Encountered In Condensate Fields

B. H. SAGE and W. N. LACEY, California Institute of Technology, Pasadena, Calif.

THE growing background of experimental information concerning the volumetric and phase behavior of binary and ternary hydrocarbon systems is used as the basis for a comparison of these systems with naturally occurring hydrocarbon mixtures under conditions representative of underground petroleum reservoirs. The qualitative and semiquantitative similarities and differences between the two types of systems are considered in reference to the possibilities and limitations of using experimental data on binary and ternary systems for predicting the volumetric and phase behavior of naturally occurring hydrocarbon mixtures of low molecular weight. The possible influence on such phase behavior of water, hydrogen sulfide, nitrogen, and components of relatively high molecular weight is discussed.

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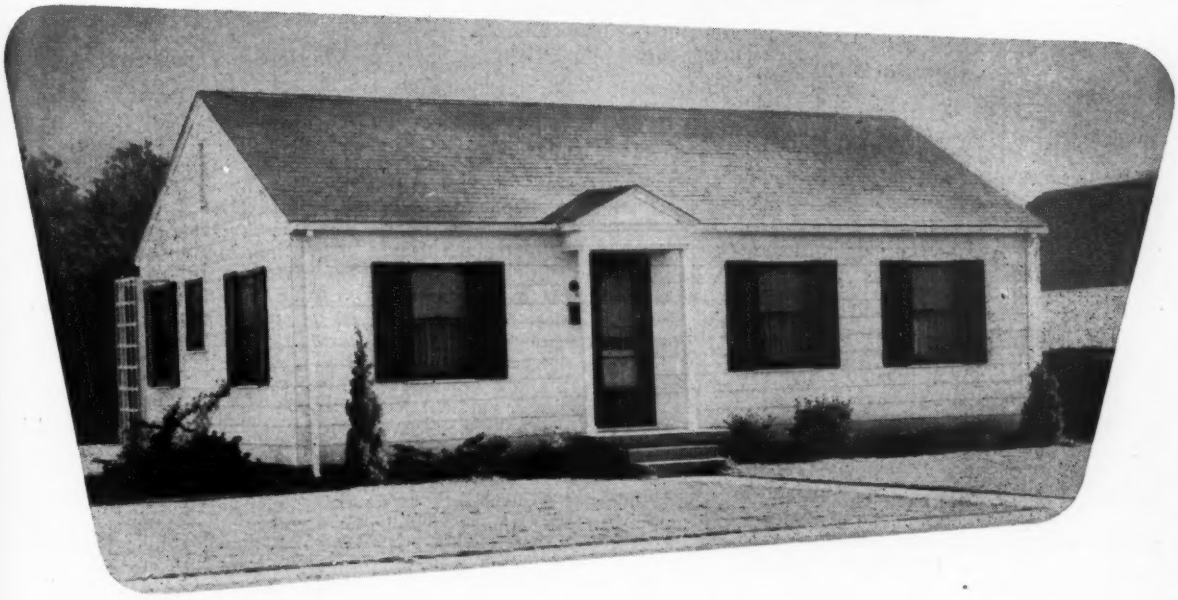

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Introduction to Induction Logging—

And Application to Logging of Wells Drilled With Oil-Base Mud

*by H. G. Doll**

Introduction

THE measurement of the resistivity of the different formations traversed by drill holes has become standard practice in oil-well drilling during the last 20 years. The technique used requires that direct contact be made with the mud filling the bore hole by means of electrodes which are connected to the insulated conductors of the supporting cable. A current of constant intensity is generally made to flow in the surrounding medium through one or two of these electrodes, called power electrodes. It produces in the surrounding medium, by ohmic effect, potential differences which are proportional to its average resistivity. These potential differences are picked up by one or more measuring electrodes, and are recorded continuously at the surface of the ground, giving the resistivity log.

*Director of research, Schlumberger Well Surveying Corp., Houston. Portion of paper presented at annual A.I.M.E. meeting, San Francisco, February 13-17, 1949.

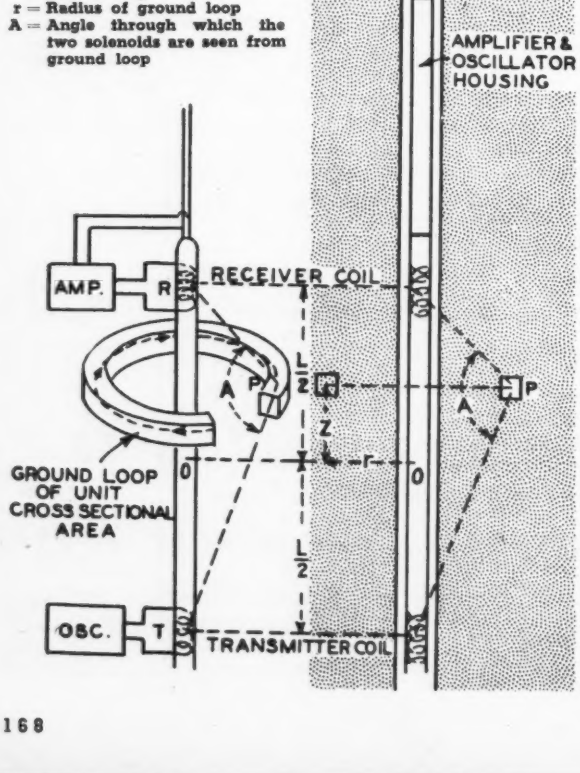
New Induction-Logging System

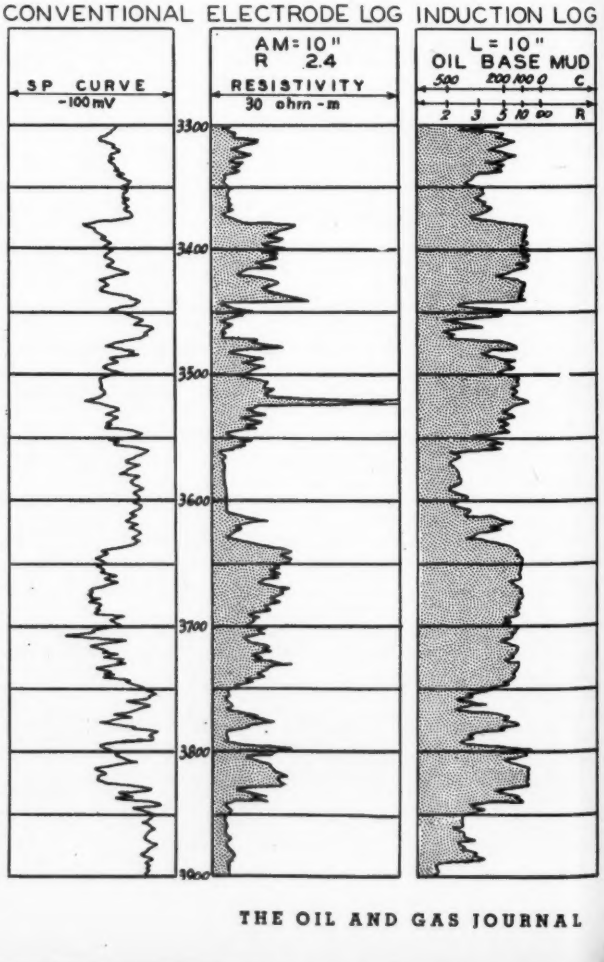
There are cases, however, where a direct contact between the electrodes and the drilling mud is not possible, for instance, in holes drilled with cable tools, which are generally dry, or in holes where nonconductive oil-base mud is used in rotary drilling. The conventional electrical logging method then requires scratcher electrodes, which are forced by springs on the wall of the hole, to make direct contact with the formations. In some cases, the results are fairly satisfactory, but sometimes, particularly in wells drilled through hard formations, the measurements are not reliable because of poor contacts with the formations. It is, in particular, for that reason that a new method of electrical logging, known as induction logging, has been introduced for resistivity measurements in oil-base mud.

The induction logging system does not require any direct contact with the mud, or with the ground. As indicated by the name of the method, the formations surrounding the logging apparatus are energized by induction. To that effect, alternating current of appropriate frequency is made to flow through a coil, referred to as "transmitter," which is supported by an insulating mandrel. The alternating magnetic field thus created generates eddy currents, which currents follow circular paths, coaxial with the hole and the coil system, in the formations surrounding said hole. These eddy currents create a secondary magnetic field which induces an electromotive force in a second

Fig. 1 A-B—(Below) Electrical principle and apparatus used for induction logging

Fig. 2—(Right) Induction log recorded in oil-base mud, alongside conventional electric log of the same well recorded later in water-base mud





coil, referred to as "receiver," mounted on the same nonconductive mandrel at a certain distance, called "spacing," from the transmitter.

If the transmitter current is maintained at a constant value, the intensity of the eddy currents is proportional to the conductivity of the ground. Thereby, the conductivity of the ground determines the secondary field created by the eddy currents, and the signal generated in the receiver.

As in regular logging with electrodes, the signal is recorded continuously at the surface of the ground while the apparatus is moved along the hole. The record thus produced, which is frequently called an "induction log," because of the way in which it is obtained, shows the variations of the ground conductivity—and, consequently, of its inverse, the ground resistivity—with respect to depth. It is, therefore, equivalent to the resistivity log obtained by the conventional method of electrical logging with electrodes in water base mud. This discussion is limited to the theory of the induction-logging method, and to considerations concerning its application in holes drilled with oil-base mud.

In conventional logging practice, the resistivity unit is the ohm-meter. Conductivities (the reciprocal of resistivities) are expressed in mhos per meter. It is preferred, however, to use units of millimhos per meter for induction logging in order to get a range of values that does not require extensive use of decimal figures. Accordingly,

$$C \text{ mmhos/m} = \frac{1000}{R \text{ ohm-m}}$$

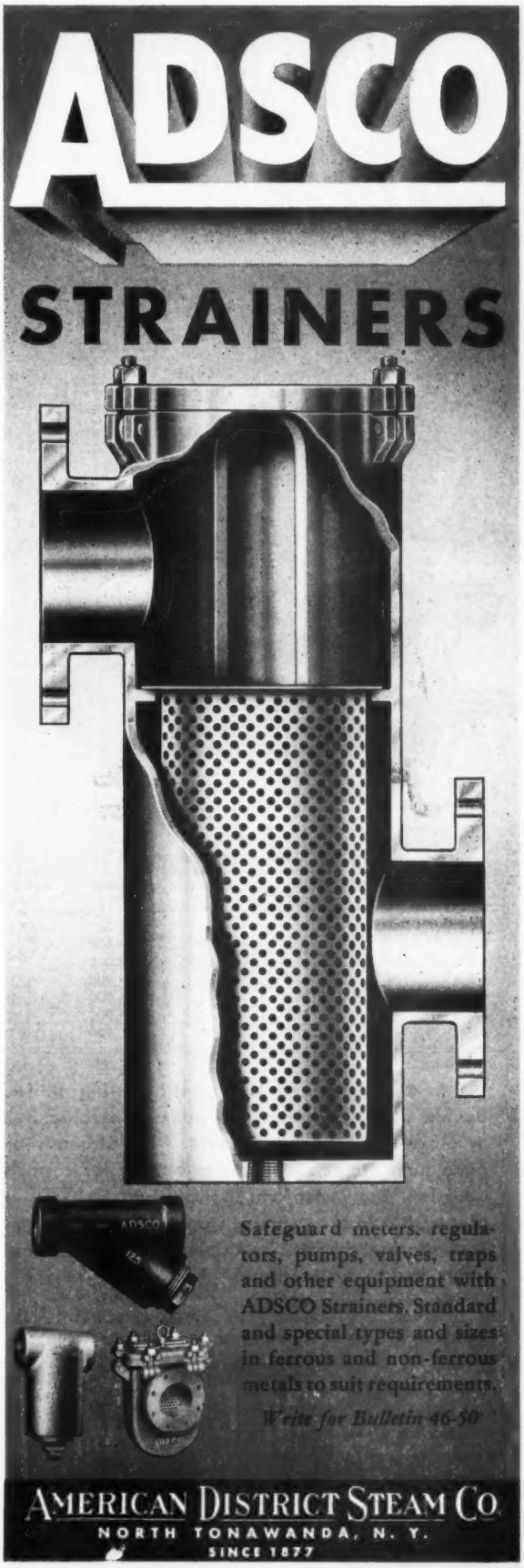
Thereby, a bed with a resistivity of 100 ohm-m has a conductivity of 10 mmhos/m.

Resistivity Measurements by Induction Logging

The apparatus used for induction logging is shown schematically in Figs. 1A and 1B; it is, in fact, a mutual impedance bridge. It comprises essentially a transmitter of coil **T**, fed with alternating current by an oscillator, and a receiver coil **R** connected through an amplifier to the recording galvanometer.

In the absence of any conductive medium around the apparatus, as, for example, when it is suspended in the air from a wood frame high enough above ground, the coupling between the transmitter and receiver coils is fully balanced, so that the measuring apparatus reads zero. When the apparatus is in a drill hole, the alternating field set up by the transmitter coil produces in the surrounding medium—i.e., in the ground—induced currents, generally known as "eddy currents," which are proportional to the conductivity of the ground.

The electromotive force induced in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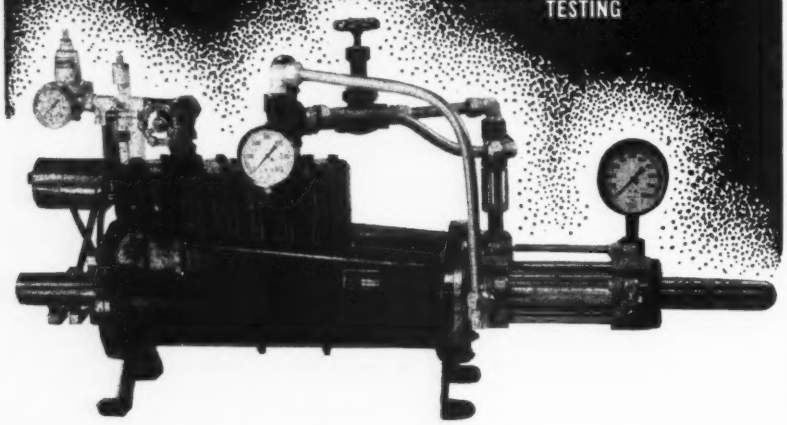

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6-5¼ " 1⅛" " "	30	0- 3,000	"	1.72 "
6-5¼ " 1" " "	40	0- 4,000	"	1.27 "
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the receiver coil by the eddy currents, referred to hereafter at "the signal," is proportional to the conductivity of the ground. If, therefore, the apparatus is properly calibrated, a measure of the signal constitutes a quantitative determination of the conductivity of the ground.

The signal is amplified and rectified into direct current for transmission in the cable to the surface where it is automatically recorded. A remote-controlled test signal is provided in the apparatus to check the calibration.

An induction log recorded in oil-base mud by the induction equipment is given in Fig. 2, alongside the conventional electric log of the same well recorded later in water-base mud for comparison.

When the ground surrounding the coil system is homogeneous, as is practically the case for a thick bed which is not appreciably invaded by the mud fluid, the conductivity, as measured by the apparatus, is equal to the true conductivity of the ground. When, however the ground around the coil system is not homogeneous, as, for example, in the case of a thin bed surrounded by formations of appreciably different conductivity, the conductivity as measured by the apparatus, represents a combination of the conductivities of the different media surrounding the coil system, and is referred to as the "apparent conductivity." This is similar to what happens for electrical logging with electrodes where the apparatus also measures an apparent resistivity. In both cases, a better approximation of the true conductivity can be obtained by applying corrections deduced from the departure curves* or correction charts.

An important advantage of the induction-logging system is that the measured values, even without corrections, are already nearer to the true values; furthermore, the corrections themselves are much easier to compute than in the case of logging with electrodes, particularly when influence of bed thickness is to be taken into consideration.

Geometry of Induction Logging

In the logging method using electrodes for the determination of the ground resistivity, the flow of current is of the radial type, and it is not possible to study separately the influence of the different regions of ground surrounding the electrode system. The reason is that the lines of current flow cross the boundaries

*Departure curves for electrical logging with electrodes have been published earlier in a booklet entitled "Resistivity Departure Curves," 1947, by Schlumberger Well Surveying Corp., Houston. The application of the curves was discussed in a paper, "True Resistivity Determination from the Electric Log—Its Application to Log Analysis," by H. G. Doll, J. C. Legrand and E. F. Stratton, at the spring meeting, 1947, of the Pacific Coast district A.P.I. meeting (published in The Oil and Gas Journal, September 20, 1947, p. 297).

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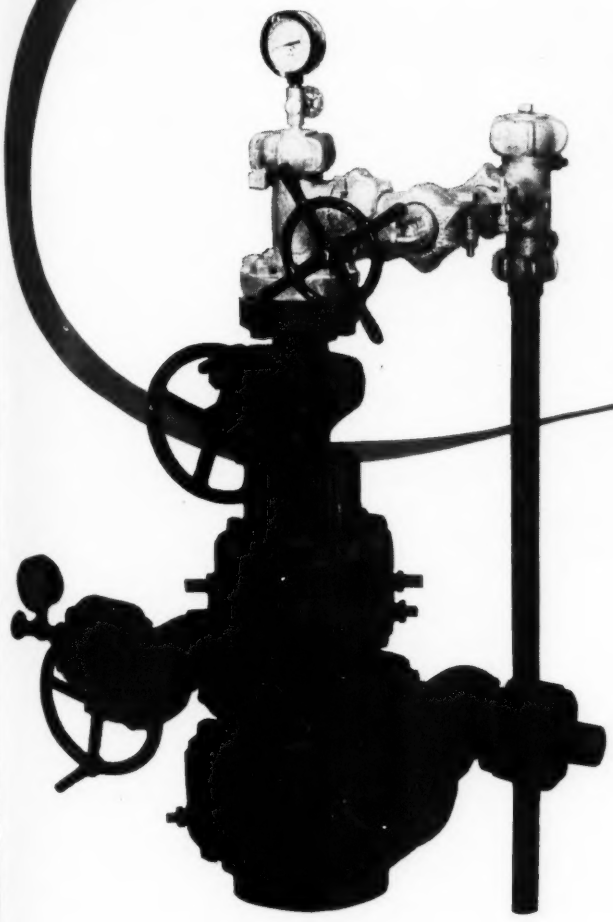

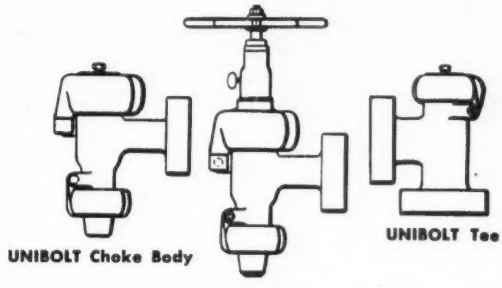

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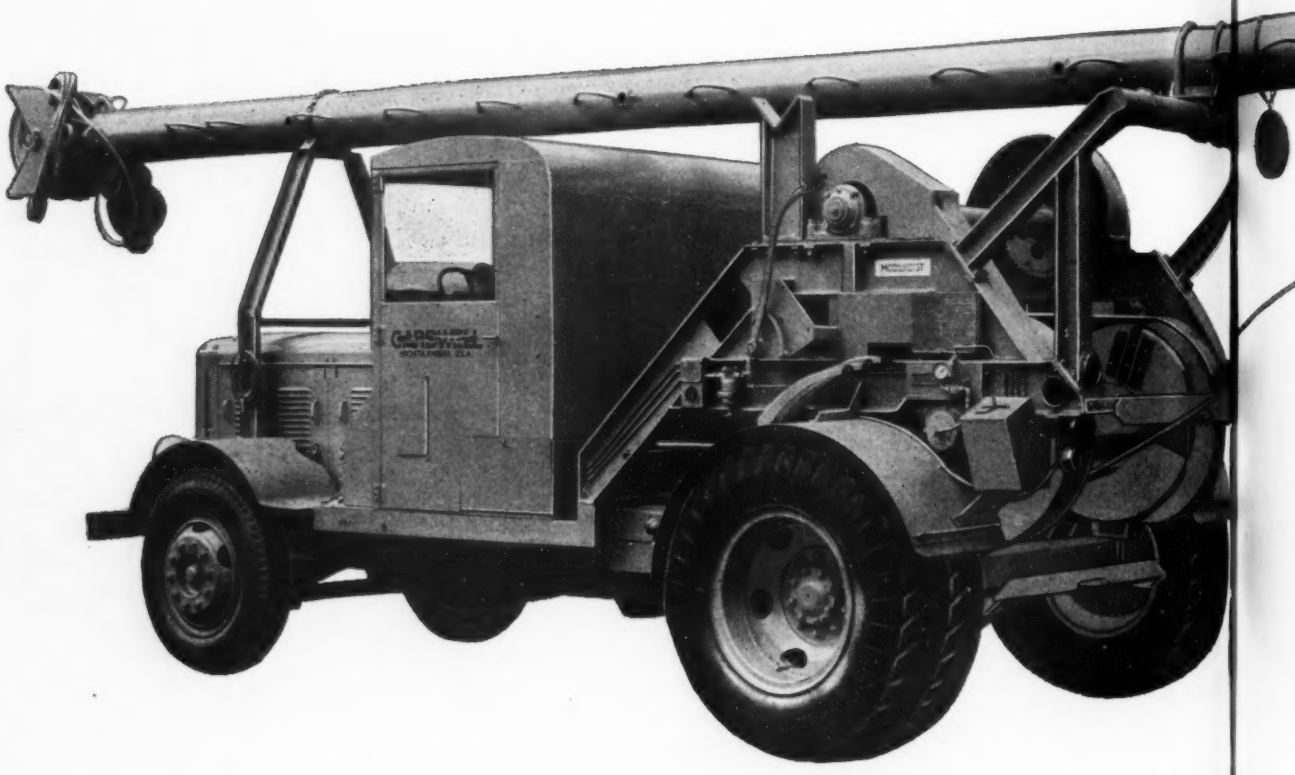

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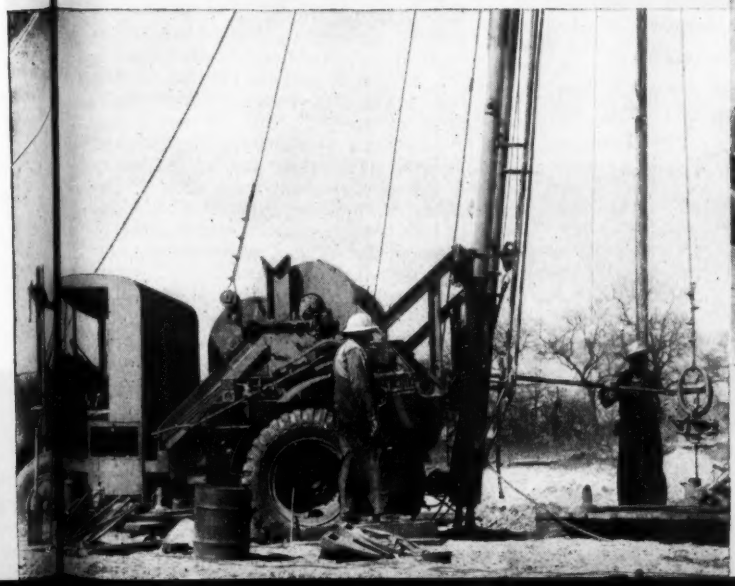

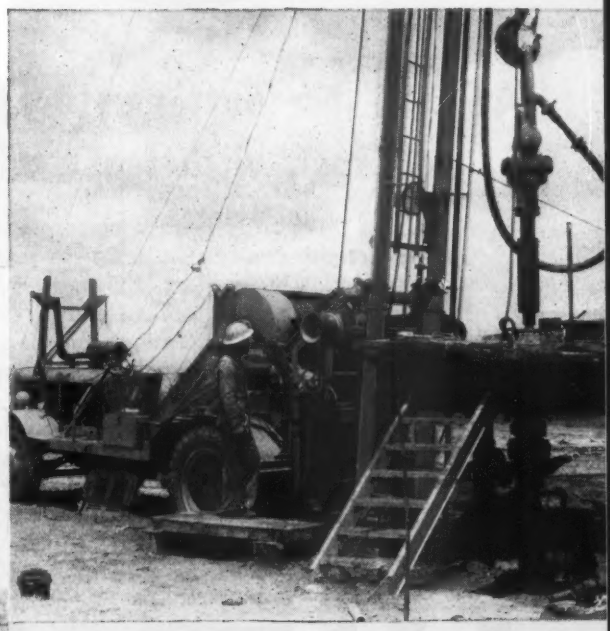

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between the different media, such as, for example, the boundary between a given bed and the bed next to it, or the boundary between the mud and a bed. If the resistivity of any given medium is changed, this affects the lines of current flow even in their path through the other media. This is why the mathematical computation of departure curves is rather complicated, and can only lead to a fair approximation as soon as the beds are not very thick and homogeneous.

In induction logging, the situation is entirely different. If the hole is vertical, as will be assumed to simplify the discussion, the lines of current flow are horizontal circumferences having their center on the axis of the hole. Since there is generally a symmetry of revolution of the ground around the axis of the drill hole, in the same medium all along its path, and never crosses a boundary between media of different conductivities.

On the other hand, and provided that the frequency is not too high, the action of the different circular currents on each other can be neglected. In this condition, the action of the different regions of ground, which individually have a symmetry of revolution around the hole, can be considered separately, and the measured signal is simply the sum of the individual signals given by the different regions. The consequence is that the theoretical computation of charts or of typical logs, corresponding to any distribution of ground conductivities, is always possible, provided, of course, that there be a symmetry of revolution, as is usually the case.

Conclusion

The conductivity, or the resistivity, of formations traversed by a drill hole can be determined by the induction-logging method. This new technique is particularly useful at present for logging dry holes and holes filled with oil-base mud, in which direct contact with the formations is difficult to establish.

The method has great flexibility, and is quite promising. Coil systems can be designed to give a focusing effect in order to obtain directly on the log a more accurate value for the conductivity of beds of finite thickness.

Since the different regions of ground have generally a symmetry of revolution around the axis of the hole, and since, therefore, the induced currents have circular paths around that axis, the currents never cross the boundary from one region to the other. In these conditions, the contributions of the different regions to the measured signal can be considered independently. For that reason, it is relatively easy to compute typical logs and correction charts, which should greatly improve the possibilities of quantitative interpretation.

GROUND WATER

..... as a source of industrial supply

by John B. Millis

EVER-INCREASING demand for water in industry has led to widespread consideration and use of ground water as a source of supply. Ground water occurs at varying depths below the earth's surface and is available in quantity only in permeable and porous zones which are fed by water percolating downward after rains or from lakes and streams. Access to this water is provided by wells, either dug, bored, driven, or drilled. These wells, cased or uncased, are commonly known as rock wells if finished in a consolidated formation such as limestone, dolomite, or sandstone; and sand, gravel, or drift wells if finished in glacial deposits, alluvium, sand, or gravel.

The spaces between the individual rock grains of the igneous and metamorphic rocks are too small to produce water in pumpable quantities. Production from either of these formations, whether wells or springs, comes from crevices created by shrinkage upon cooling, by drainage of molten material, or by solution of relatively soluble deposits.

Some pore spaces found in igneous rocks were created during the cooling process but are generally unimportant. Crevice joints and cracks when interconnected and exposed to a source of water then constitute a ground-water reservoir, and the limitation of sources of infiltration limits the value of these rocks as sources of ground water.

Limestones, dolomites, and sandstones are sedimentary rocks and are often the producers of substantial quantities of water. The ability of limestone or dolomite to produce water is dependent upon the void areas within the formation (crevices, fissures, caverns, and solution channels) and the amount of recharge from precipitation. Occasionally "reef areas" occur where the dolomite is quite porous due to the nature of the process of formation.

A cross-sectional drawing of subsurface limestone would indicate that water circulation is confined to fractures and solution channels; a well penetrating such fractures or channels would obtain water through these openings. The occurrence of water is limited to the upper portions where the greatest void space of the formation exists. Where solution channels exist, the storage volume is often very large.

Small yields are encountered in some areas where clay or shale immediately overlay the limestone, or streaks of shale are observed in the upper creviced portions.

Limestone and Dolomite Reservoirs

Limestones and dolomites when considered as water-producing formations, should be studied as similar to extensive underground reservoirs. A study of the characteristics of the overburden, data on precipitation, runoff, infiltration, stream influence, and production tests will provide information concerning the value of the formation as a continuing water producer.

When limestones or dolomites of considerable extent exist and are prolific producers, contamination might be transported some distance through crevices, and where large fissures or crevices are connected directly to the surface, heavy rains might, on occasion, cause a turbid condition of the water for a period of time. Chemical and bacteriological control of water is important since ground supplies could conceivably be ruined by its improper treatment and disposal.

A few of the economic and physical advantages in a limestone supply existing near the ground surface are: (1) pumping cost, (2) initial cost of completed unit, and (3) lower water temperature than that from a greater depth.

Sandstone Reservoirs

Extensive beds of sandstone outcrop and underlie various portions of the North American continent. The greatest known fresh water-bearing sandstone systems in the United States are the Illinois-Wisconsin and the Dakota. These producing formations are usually considered "confined aquifers" because substantial layers of impervious formations are generally present immediately above and below the sandstone.

John B. Millis, located at 1955 East 73rd Place, Chicago, has spent most of his life in exploration and development of ground-water supplies. He has studied extensively ground-water conditions throughout the United States and has been connected with Illinois State Water Survey Research Division on ground water, and also has acted from time to time over the past 25 years in a consulting capacity relative to development and securing ground-water supplies in the Mid-Continent area. A second article by the author on this subject will appear in an early issue.

The word "aquifer" refers to a geological formation or structure which transmits sufficient water to supply wells and springs. An artesian well is one drilled into a confined or artesian aquifer in which the static water is above the ground at the well.

The Illinois-Wisconsin sandstone system comes to the surface in Central Wisconsin. Therefore, the major water infiltration into the system is in that area. An area of natural discharge has been indicated in sections of Illinois and some local recharge of the sandstone apparently taking place there through heavy overburdens of sand and gravel. An over-all general hydraulic slope has been indicated as 1 ft. per mile, and the velocity of percolation under natural conditions has been calculated at 1,760 ft. per year, or 4.82 ft. per day. In average sand and gravel and sandstone formations, the rate is more nearly 60 ft. per year, or 0.164 ft. per day.

The Dakota system has its outcrops in the Black Hills region. This formation extends to eastern Minnesota, and it also underlies most of North and South Dakota, Nebraska, the western portion of Kansas, and sections of Iowa.

These sandstone formations are, as a rule, continuous and widespread. Their porosity varies from 30 to 40 per cent, and more in clean, uncemented sands of uniform grains. Obviously any figure on porosity is not an indication of potential yield without knowledge of the mechanical composition.

The flow of water through sandstone to the well bore is not as large as through fissures in limestone or in some sand and gravel deposits. The volume of the water which can be obtained from a sandstone stratum depends on its thickness as well as on its ability to transmit water. Although a well of the same specifications may be drilled in the vicinity of a good producer, the rate of production may on occasion be disappointing, due to change in character of the particular formation or often of the accompanying formations. Reduction of permeability in the sandstone is often caused by deposition of "fines" such as clay.

Water from sandstone is usually of constant temperature and mineral content. Recharge is slow due to the relatively poor ability of the formation to transmit water.

Gravel Formations

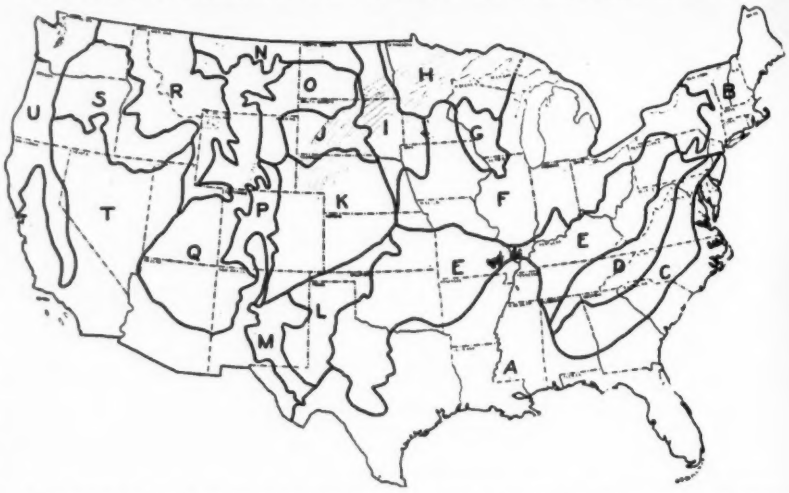
Gravel is often the best type of formation from which to obtain water. This type of formation supplies most of the strong wells in the United States and furnishes more water to wells than all other formations collectively. A coarse, clean gravel readily collects and stores water in large quantities and yields freely to wells. Gravel sources are not as extensive as sandstone nor as uniform in capacity.

A survey of ground-water availability in its preliminary stage is a regional study dependent to a large extent on the regional geology. Reference can be made to Water Supply Paper 489 of the U.S.G.S. wherein data have been summarized to indicate areas of regional similarity in ability to furnish ground water. Such regional data are of preliminary value to those who desire information on ground-water availability. However, this primary regional data must be examined relative to local conditions of geology and hydrology. The water sources must be considered, the ability of formations to yield water should be studied, and the local extent of pumpage should be determined. A survey of existing wells in the locality provides confirmation or exceptions to regional information.

Water-Well Development

Ordinarily, preliminary investigations to determine the availability of ground-water sources can be made by studying local municipal operations to determine the source of such supplies and if such water sources are

GROUND-WATER SUPPLY AREAS OF THE UNITED STATES



A—Atlantic Coastal Plain Province.—The ground-water condition in this province is generally good. Water is obtained from the sand, gravel strata of Cretaceous, Tertiary, and Quaternary age; also the alluvial gravel in the Mississippi Valley. Ground water is generally soft and low in mineral matter.

B—Northeastern Drift Province.—Principal supplies are from glacial drift and outwash gravels, notably on Long Island. The till yields small supplies in places. Ground water is generally soft and low in mineral matter.

C—Piedmont Province.—This is a poor area for ground water. Such supplies as are available are generally small in quantity, low in mineral matter, and obtained from wells drilled in the rock.

D—Blue Ridge Appalachian Valley Province.—This is a poor area for ground water though there are numerous springs and some shallow wells in rock.

E—South Central Paleozoic Province.—Ground conditions as a whole are poor in this area, especially in the sandstone and limestone areas. In many of the valleys large supplies are obtained from glacial outwash and alluvial sands and gravels.

F—North Central Drift Province.—Large numbers of wells obtain satisfactory supplies from the glacial drift; glacial outwash or gravel beds in the till of the surface formations. There are also many deep drilled wells in the underlying sandstone or limestone which yield satisfactory supplies. The waters are generally hard but good otherwise.

G—Wisconsin Paleozoic Province.—Water is obtained from drilled wells of moderate depth in the sandstone or limestone. There is little or no drift except in the valleys where satisfactory supplies are sometimes obtained from the outwash gravels.

H—Superior Drift—Cretaceous Province.—Satisfactory supplies are obtained in most places from the glacial drift. Where there is no drift ground water is scarce as there are no younger formations intervening between the drift and the crystalline pro-Cambrian rocks.

I—Dakota Drift—Cretaceous Province.—Hard but good water is obtained from the glacial drift in most places or from the underlying Dakota sandstone in deeper wells. There are many areas of artesian flow from the Dakota sandstone but the water is high in minerals.

J—Black Hills—Cretaceous Province.—This is a poor area for ground water as it is underlain by various shales containing no water.

K—Great Plains—Cretaceous Province.—The Tertiary sands and gravels and Dakota sandstone in this area are the principal sources of water. Exceptionally good yields are quite generally available, especially in the valleys of the larger streams where outwash sands and gravels are present.

L—Great Plains—Pliocene Province.—The main sources of water in this area are from the Tertiary sands and gravels under conditions similar to those in province K. The area is underlain by the Permian "red beds" which do not yield much water. The all-around situation is not as good as in Province K.

M—Trans-Pecos Paleozoic Province.—The ground water conditions in this area are generally poor as only small, highly mineralized supplies are available, except in the Pecos Valley.

N—Northwestern Drift Province.—Supplies in this area are obtained from the glacial drift and underlying Eocene and Upper Cretaceous formations. Where there is no drift or it is dry, wells in the lower formations are likely to be unsatisfactory. This is a poor district for wells.

O—Montana Eocene Cretaceous Province. This is a poor area as a whole though small supplies are obtained from lenses of sand, gravel, and coal in the underlying Fort Union and Lance formations when present; otherwise there is little or no ground water available.

P—Southern Rock Mountain Province.—This is a high, mountainous area with little or no ground water available.

Q—Montana-Arizona Plateau Province.—This is an arid to semiarid region underlain by sedimentary deposits of various ages. On the whole, water supplies are not plentiful or of good quality.

R—Northern Rocky Mountain Province.—This is a region of mountains and valleys with little or no ground water available in the mountains. Locally there are places where satisfactory supplies can be obtained from sandstones or water-bearing gravels.

S—Columbia Plateau Lava Province.—The main sources of ground water are from lava beds and associated beds of sand and gravel though in places these formations are too deep to be reached by wells. In other places glacial outwash gravels and valley fill yield large quantities of water.

T—Southwestern Bolson Province.—This province is in an arid region, the main sources of water being the alluvial sands and valley fill underlying the valleys of the region. In the valleys of California large quantities are used for irrigation.

U—Pacific Mountain Province.—This is an area of high mountains and valleys with heavy precipitation. All together the ground-water situation is not favorable; however, there is glacial drift available in the northern parts that yields water.

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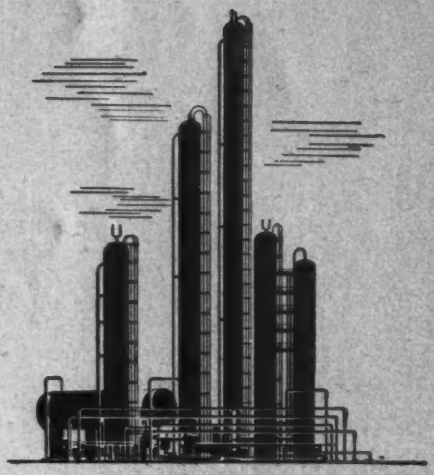

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of surface or ground origin. On occasion it may be found after preliminary study that economics dictates the purchase of water from locally developed supplies.

In the study on development available details must be assembled regarding the formations from which a satisfactory supply might be obtained. This requires a more thorough assembly of data relating to all existing sources of water. Such field work includes collecting information regarding the producing formations, the depth to water, the pumping and nonpumping levels, specific capacities, influence between wells, recession of ground water, and recharge data.

The recharge area is that portion of land surface which will permit the infiltration of precipitation. Areas having little precipitation must be closely investigated to determine the storage capacity of the water-producing formation. Withdrawal in excess of the amount of recharge will deplete the formation. The mineral and bacteriological content of the water should be investigated in order to establish its suitability.

Drilling and Completions

A feature which adds much to successful completion of a well is to secure water samples at each change of formation. When any change of static water level is noted during drilling, indicating a producing zone, a water sample should be taken from the bottom of the hole. Such samples can be secured by using a tight bailer with samples taken from its bottom. As a general rule samples taken when drilling with rotary tools are worthless.

Limestone Wells

Development of large water supplies from limestone may require preliminary drilling of test holes. Pumping the most promising while observing water levels in the others will outline and evaluate the local permeable areas. Once again, knowledge of recharge is important. The investigator must remember that the avenues through which water flows in limestone are usually of a vugular nature but crevices, solution channels, and fissures also provide channels of travel.

One method of completing a well in a limestone or dolomite formation is to acidize after the well has been drilled to final depth. A stage or two of 15 per cent HCl will do much for cleaning the interstices which become clogged while drilling. In some areas the well must be sealed in before acid treatment to retain the gas pressure generated during the operation.

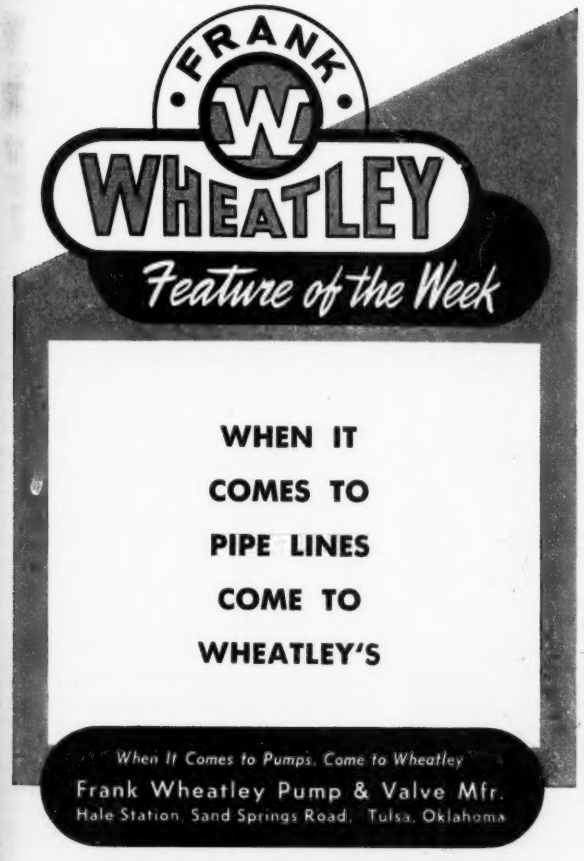
Where knowledge of the solubility of the formation is lacking it is customary to remove the fluid within a few minutes after its introduction, although in some cases the fluid may be left in the well for a full day or two. Acid ordinarily should not be left in the well after pressure starts to drop.

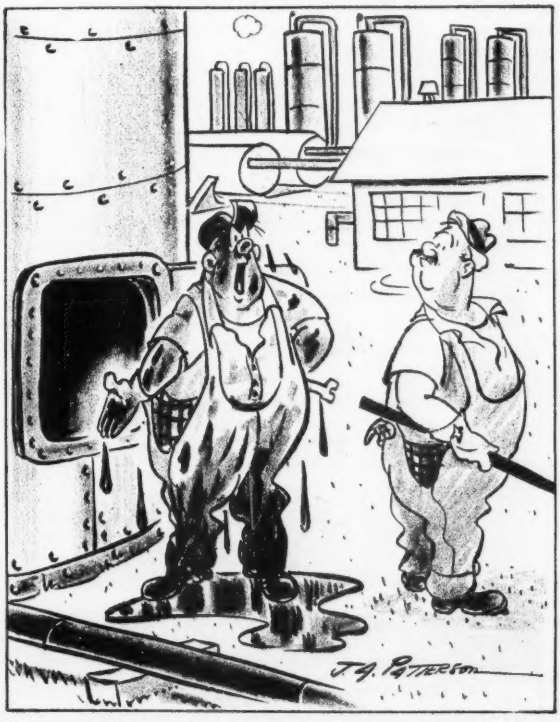
Sandstone Wells

Sandstones are usually beds of considerable extent, and preliminary test holes are not generally necessary. If sufficient capacity can be economically obtained from a deep sandstone, it is often desirable to case off upper limestone waters for the purpose of obtaining a better quality of water. On other occasions, quantity without regard to quality may be of most importance.

Movement of waters from one formation to another takes place by way of the well bore and direction of the movement may reverse over a period of time. The extent and time of such movements are dependent on (1) the relative static head in the producing formations, (2) the dynamic heads prevailing during pumping periods, and (3) the relative abilities of the various producing formations to give and receive water. The other factors controlling such movements include pumpage in the surrounding areas, and the relative recession of static heads of the producing formations. To shut out waters from other producing formations in a sandstone well, the casing should be cemented.

By virtue of these water movements, chemical reactions have altered





THE OIL AND GAS JOURNAL

"Of course it's me—who'd you think it was, Lana Turner?"

the producing characteristics of formations. For example, an upper limestone water with its dissolved iron oxidized by exposure to air, on transfer to a sandstone formation of lower static head, would tend to reduce porosity, particularly at the surface of the sandstone. Clogging of the sandstone at the well bore was considered (Leverett in 1897, and Slichter in 1910) to be a mechanical operation.

Another authority contended that reduction of yield in sandstone wells was due to variation of water velocities in the formation between pumping and nonpumping conditions, which caused a breakdown of soft materials, and plugged the pores at the well bore. Another theory suggests that clogging is due to calcium carbonate precipitation resulting from the liberation of CO_2 by reduction in pressure near the well bore.

The history of sandstone water supplies indicates that continuous pumping from the formation causes a reduction in both static and dynamic water levels. In given areas of the Dakota sandstones water levels have receded from 6 to 15 ft. per year. In certain areas of the Illinois-Wisconsin system average yearly recession has been calculated at 7 ft. per year for over 60 years.

The capacity of individual sandstone wells can be increased by proper use of explosives. Experience is necessary for proper shooting and care must be exercised in interpreting the well log in order that the shots be properly placed.

For wells completed in sandstones where shooting is necessary geophysical logging is usually advantageous in determining shot locations. Logging has indicated that sandstones do not have the same producing capacity for the entire thickness of the formation. Adequate shooting at the proper zone normally results in an increase in production at a given pumping level.

After debris from shooting has been cleaned out, a light knock-down shot should be discharged to clean up the partially loosened material on the walls of the bore hole. Further cleaning of the well may be indicated by production tests. The well should be thoroughly bailed after removing the test pump.

Sand and Gravel Wells

Accurate location of the sand and gravel well is of prime importance. Outlining the local deposit is of particular advantage and can be aided by geologic maps, resistivity tests, local inquiry, or prospect holes. If a deposit exists, several test holes should be drilled and the most favorable of them completed while remaining ones are used for observation purposes.

The difference between a prospect and test hole should be understood. The prospect hole, if drilled with care, will produce samples of formation, indicate its vertical thickness, and provide water-level data. The test hole, drilled as a result of advance prospect holes, can be properly screened and pumped to determine, by use of observation holes, the extent of the aquifer and its value as a producer of water. Samples of water can be secured to determine the mineral and bacteriological content. Information can be obtained to determine the number, spacing, and type of construction desirable for the finished wells.

The method of drilling prospect or test holes, or even the main well, is a controversial subject. Usually, it is a case of cable tools versus rotary method. Many distinct advantages and disadvantages are claimed for each.

Caltex Gets Tanker Charter

The 23,450-ton diesel tanker, Atlantic Queen, which was recently delivered to Monacus Co. of Kungsbacka by the Gotaverken shipyard of Goteborg, Sweden, has been fixed on a 10-year time charter to the California Texas Oil Co., Ltd., organization, according to reports from Stockholm.

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BOOKS

ARABIAN OIL: AMERICA'S STAKE IN THE MIDDLE EAST. By Raymond F. Mikesell and Hollis B. Chenery. Published by University of North Carolina Press, Chapel Hill, N. C. 201 pp. $3.50.

This is the story of American petroleum interests in the Middle East since the 1930's, and their relation to our national oil policy. It provides a clear account of the tangled events leading up to the present dominant position of American enterprise in Middle East oil discovery and production. The development of the petroleum concessions in all of the Middle East countries is discussed, but major emphasis is given to Saudi Arabian Oil Co.'s concession in Saudi Arabia, where the effects of the great oil discoveries upon the welfare of 4½ million Saudi Arabians and the relations between Aramco and the Saudi Arabian Government are also explored. The authors have also sketched a future pattern of world production and trade. The final chapters are devoted to a discussion of United States foreign policy including the review of the efforts of the U. S. Government to participate directly in Middle East oil operations, and the controversy over U. S. Navy oil purchases from Arabian American Oil Co. This factual and technical study not only provides useful information regarding the technical, legal, and economic problems of oil recovery in the Middle East, but it also presents a significant case study of a foreign investment and its relation to United States foreign economic policy.

CONSERVATION OF OIL AND GAS. A Legal History, 1948. Edited by Blakely M. Murphy. Published under sponsorship of Section of Mineral Law, American Bar Association, 1140 North Dearborn Street, Chicago. $3.

This volume, prepared by a five-man publication committee headed by Walace Hawkins, Dallas, summarizes the legislative, administrative, and judicial activities of each producing state and presents their conservation records. The book is divided into four parts: (1) Fundamentals of Reservoir Behavior that Relate to the Conservation of Oil and Gas, (2) Legislative, Administrative, and Judicial Concepts of Oil and Gas Conservation as Applied Within the Jurisdiction of the States, (3) The Interstate Compact to Conserve Oil and Gas and Its Administrative Arm—The Interstate Oil Compact Commission, and (4) The National Government and the Conservation of Oil and Gas. In an appendix is shown the official state conservation agency, its composition, and address. The volume contains an outstanding footnoting of the literature and materials relating to conservation.

The volume is neither a textbook nor a technical treatise of the regulations of oil and gas production. It is a handbook that will find use not only by attorneys but by legislators, administrators, judges, and private citizens who want to know more about how to preserve oil and gas.

A.S.T.M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS. Prepared by A.S.T.M. Committee D-2. Published by American Society for Testing Materials, 1916 Race Street, Philadelphia. 768 pp. $5.50. A.S.T.M. Members, $4.25.

Annually since 1927 there has been issued a special compilation of A.S.T.M. Standards covering petroleum products and lubricants. This volume answered the demand for a convenient, compact source of all petroleum test methods, definitions, and specifications issued by A.S.T.M. As revisions appear each year in existing standards and new tests and specifications are added, they are given in the latest edition of this publication. The 1948 edition gives in their latest approved form 108 test methods, 31 specifications, 6 lists of definitions of terms relating to petroleum, to materials for roads and pavements, and to rheological properties of matter; and one recommended practice for designating significant places in specified limiting values.

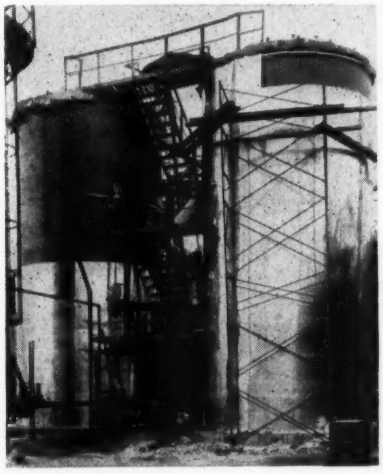
PRINCIPLES OF PETROLEUM GEOLOGY. By Cecil G. Lalicker. Published by Appleton-Century-Crofts, Inc., 35 West 32nd Street, New York. 377 pp. $5.

In this book the stratigraphic and geographic distribution of petroleum is given in detail. Emphasis has been placed on principles of petroleum geology, the mode of origin of oil and gas structures, and petroleum discovery methods. The oil and gas fields described in the book have been selected from various petroliferous provinces in the world, and are grouped according to their origin. Consideration is given to the influence of geological factors on various types of recovery methods and valuation of oil and gas properties. The book is liberally illustrated with drawings, diagrams, and maps.

Refinery Insulates Tanks With Loose Mineral Wool

TO minimize heating requirements and keep viscous oils in a fluid state, these two tanks at Montreal, Canada, were insulated with a 3-in. thickness of loose mineral wool.

Aluminum sheets were fastened to the tank surfaces by means of "Z"



lugs. Loose mineral wool was installed between the sheets and the tank at each rise of sheets.

Mineral wool was used in this application because it remains in place without settling when installed at the proper density. It has this property because the fibers of the loose irregular mass knit themselves together and exert internal pressure on every part of the mass sufficient to support every part directly adjacent and above it. The weight of every part is not enough to exert a downward force sufficient to counteract this internal mass pressure which is exerted in all directions.

The aluminum sheets not only serve the purpose of supporting the insulations, but also act as a vapor seal and weather protector, replacing weatherproof coatings of asphalt or similar material which would otherwise be required.

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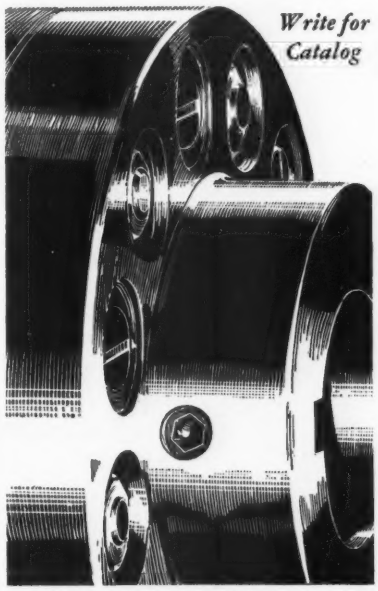

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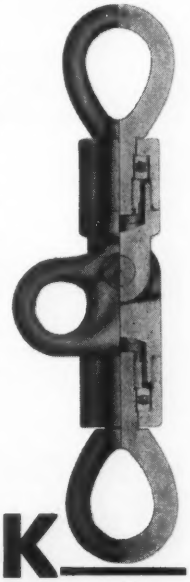
SPINNING LINE SWIVELS

Patented

They reduce wear on lines . . . quickly pay for themselves by time saved in spinning up drill pipe and casing. Straight line pull from cat head to both spinning line and tong line, prevents line kinking and permits spinning up pipe and tightening tongs with same wrap around cat head. They are ball bearing equipped and grease packed.

Fully covered by U. S. Patent No. 2212344



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CAPACITY LOSSES— THEIR CAUSES AND CORRECTION---

This picture shows actual condition of a 24" main before cleaning. Note the condition of the deposit, not only the thickness but particularly the rough and porous surface. These are only some of the many factors that contribute to capacity losses.

C Value before cleaning 69 GPD before cleaning 5.6 MGD

Note after cleaning and lining by Pittsburgh Eric Process the smooth, clean interior of the pipe which does not hinder the flow of the water and restores the pipe to its original capacity.

C Value after cleaning 130 (average of tests) GPD after cleaning 10.6 MGD

Whatever problems you have — Industrial — Municipal — Plant — Railroad — Maintenance — Supply — Engineering!!! If they pertain to water supply or sewage disposal a Pittsburgh Pipe Cleaner Company engineer can solve them. Our complete comprehensive rehabilitation program and engineering service is THE ANSWER. Write today for full details.

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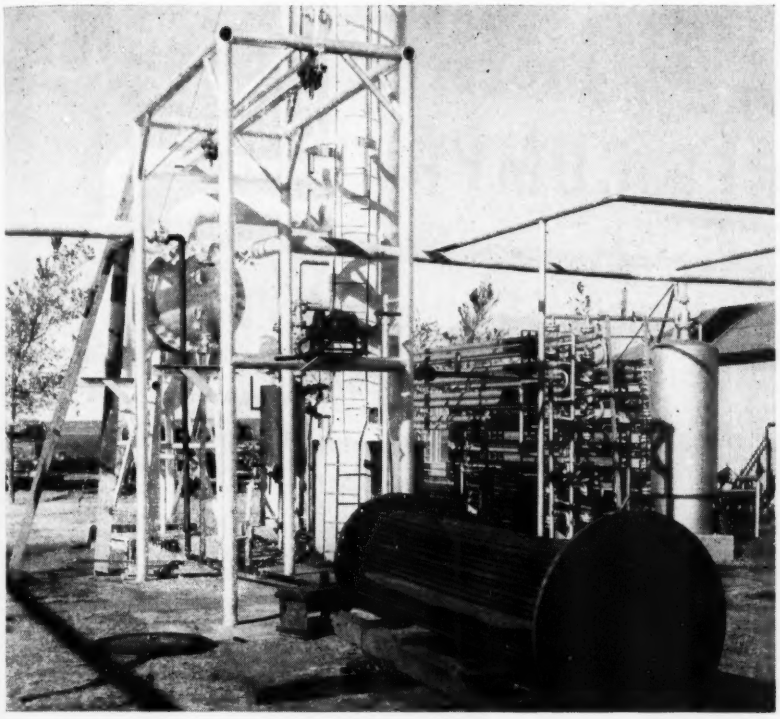
PIPE-LINE SUGGESTIONS



Hand Winch on Rack At Dehydrator

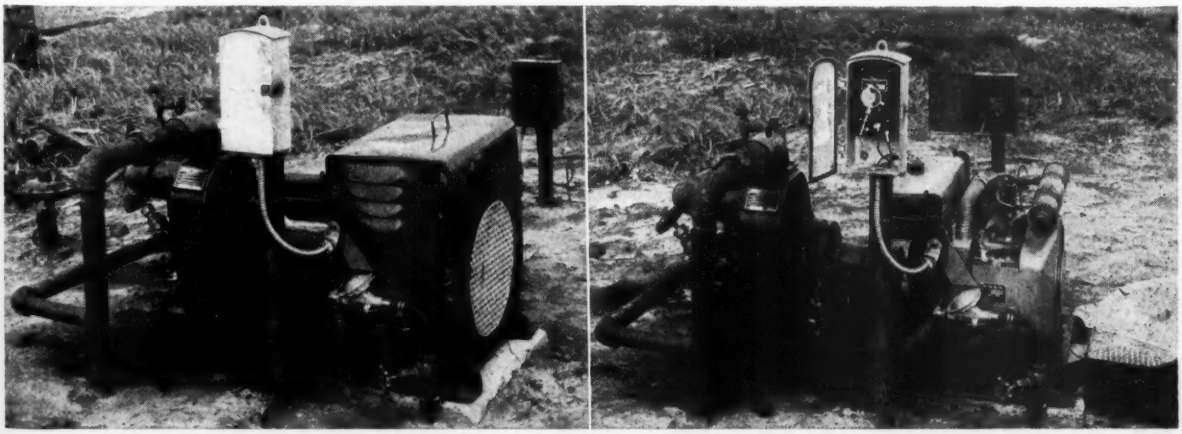
A HAND winch has been installed on the rack used for removing tube sections from the reboiler of a dehydrating unit at a natural gas compressor station in Kansas. As a result, two men can remove and clean the tube sections. Formerly this operation required a truck equipped with a winch and several more men. The rack is fabricated of scrap pipe which holds an overhead trolley track.

Counterweighted Hose For Butane Loading

WHERE butane is delivered through a line to facilities for loading tank trucks, counterweight equipment has been installed so that the handling of hoses is simple, safe, and convenient. Each hose runs through a large pulley that is suspended from a line running through pulleys on a T-shaped support to a counterweight near the ground. The counterweight holds the hose so that it is out of the way during loading. When the hose is not in use, the weight of the hose offsets the counterweight sufficiently to permit the nozzle to rest in gravel on the ground. Any leakage from the nozzle when it is not in service will seep into the ground, thus avoiding hazard from vaporized butane escaping directly into the air. These facilities have been installed in the Tyler, Tex., area.

Weather Hood for Gathering-Line Unit

A CONVENIENT hood of special design has been devised to protect the engine of a small gathering line unit installed on a crude-oil pipe-line system in southern Oklahoma. The hood has been made so that it is hinged at the engine base enabling operators to swing it readily on and off. A grid and louver vents provide for air circulation. The exhaust protrudes through a perforation in the hood. The unit is controlled by a time switch.



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ONLY THE O-C-T C-19 MEETS EVERY WELL COMPLETION CONDITION WITH A SINGLE COMPACT MODEL

SET IT LIKE THIS

The O-C-T "C-19" Casing Hanger is the only slip type hanger that can be wrapped around the casing and seated through the preventers to form automatically a permanent seal between strings before the preventers are unflanged.

OR SET IT LIKE THIS

If pipe sticks, a collar is located in the blowout preventers, or rams freeze partly open, the preventers may be picked up in the conventional manner and the C-19 hanger wrapped around the pipe and seated in the head to give a permanent seal in a fraction of the time required by a conventional hanger.

AVAILABLE IN TWO MODELS . . . WITH OR WITHOUT LOCK SCREWS.

PLUS THESE OTHER O-C-T FEATURES

1. Load capacity twice as great as conventional slip hangers. Will swing full weight of longest strings without mashing pipe.
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4. Slips bite evenly—tooth pressure is uniform from top to bottom.
5. The seal is automatic when casing weight is applied. No manual work required.
6. Seal requires no field welding.
7. Hazardous installation work in muddy and cramped cellar space reduced to minimum.
8. Saves valuable rig time.

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ENGINEERING *fundamentals*

Porosity-Permeability Relationships

TWO characteristics which must be possessed by all reservoir materials are porosity and permeability. It is generally recognized that there is no fundamental interdependence between porosity and permeability. A core specimen may possess storage capacity, i.e., porosity, but if sealed through the center it may have no permeability. The reverse of high permeability with a low porosity might also be true. In spite of this fundamental lack of correspondence between these two properties there can be found a definite variation between them within systems of specified pore types. Such a correspondence is often useful in engineering applications or in the estimate of either of these two quantities from the other.

Although it is recognized that the straight bore capillary is an ideal system not representative of actual reservoir systems, it is informative to examine such a system when seeking qualitative variations.

Consider a porous body of cross-sectional area A and length L, as being made up of a number, n, of straight bore capillaries in parallel, all capillaries being of the same radius R and length L. The flow through these n capillaries according to Poiseuille's law would be:

$$Q = \frac{n \pi R^4 \Delta P}{8 \mu L} \qquad (1)$$

The flow through these capillaries can also be expressed by Darcy's law as:

$$Q = \frac{k A \Delta P}{\mu L} \qquad (2)$$

where k is the permeability of the group of capillaries as a whole and A is the cross-sectional area, not of the capillary openings themselves, but of the porous material of which the capillaries are the conducting channels.

The pore volume, which is equal to the volume of the capillaries, will be $n \pi R^2 L$. The bulk volume of entire system will be equal to the product A L. Therefore, the porosity of the system is:

$$\phi = \frac{n \pi R^2 L}{A L} = \frac{n \pi R^2}{A} \qquad (3)$$

By equating (1) and (2) and substituting $A = n \pi R^2/\phi$ in the result, one obtains:

$$R = \sqrt{8}\ \sqrt{k/\phi} \qquad (4)$$

That is, the porosity and permeability are related through the radius R of the capillaries of the system. This result, based on uniform capillaries, has been found to be a useful expression where an average pore radius is desirable, the factor $\sqrt{8}$ being replaced by some other constant. For example, Leverett[1] has used this parameter in the correlation of capillary pressure values on unconsolidated sands.

The relationship between permeability and porosity of Equation 4 can be expressed in terms of another variable in place of R. Consider the internal area of the system chosen. The total such area is:

$$\text{Surface area} = n\, 2\pi R L \qquad (5)$$

The specific area is defined as the surface area per unit of pore volume, and will be denoted here by S_A. This quantity would be:

$$S_A = \frac{n\, 2\pi R L}{n \pi R^2 L} = \frac{2}{R} \qquad (6)$$

Therefore, the R in Equation 4 could be replaced by $2/S_A$ to give:

$$S_A = \frac{2}{\sqrt{8}} \sqrt{\phi/k} \qquad (7)$$

The specific area is introduced as a parameter relating porosity and permeability because for systems other than ideal ones a single value for the average radius carries very little meaning.

Equation 7, when a general constant is substituted for $2/\sqrt{8}$, and when the equation is reversed to read:

$$k = \frac{\phi}{t S_A^2} \qquad (8)$$

is known as the Kozeny equation. It has been used by Rose[2] as a basis for relative permeability evaluation. The factor t is sometimes known as the tortuosity of the porous system, its value presumably giving the deviation of the system from the ideal capillary system first chosen.

Neither Equation 4 nor 8 can be used to give the dependence of porosity and permeability without the knowledge of an extra variable. Within a system where the surface area was constant but the pore structure varied from specimen to specimen the ratio of porosity to permeability would be constant. In natural rock systems, however, the surface area, as well as the porosity and permeability, will vary.

It is to be noted that in the equations given above permeability must be in fundamental units, which in the c.g.s. system is centimeters squared.

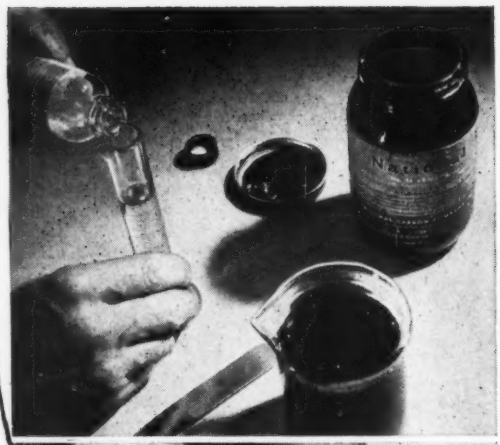
References

1. Leverett, M. C., Capillary Behavior in Porus Solids, A.I.M.E. Trans. 1941, Vol. 142, p. 161.

2. Rose, Walter, Theoretical Generalizations Leading to the Evaluation of Relative Permeability, presented at the Petroleum Division A.I.M.E. annual meeting, Dallas, Oct. 1948.

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

How to cement a "Karbate" threaded pipe joint—



1. Thoroughly mix "National" cement with "National" accelerator in recommended proportions.

2. Pour part of the mixture onto a table and work it carefully into the threads of the collar...

3. Then work mixture into pipe threads...

4. Screw collar firmly in place and wipe off excess cement with acetone... the resulting joint is as strong and impervious as the pipe itself!

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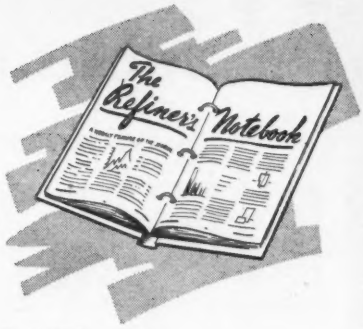

A WEEKLY FEATURE OF THE OIL ANG GAS JOURNAL

Depreciation Rates—Refining

REFINERY EQUIPMENT, YEARS USEFUL LIFE

	Bull. F[1]	Common[2,3]
Agitators or treating vessels	25	7-16
Buildings and structures	..	12-33
Buildings, brick pump, receiving houses	..	34
Buildings, frame	..	10-20
Boilers	..	6-10
Carbon black plants	20	12.5
Chemical plants, alky., isom., or poly.	..	5
Condenser, boxes	25	10-20
Condenser, coils	25	4-10
Condenser, tubular	20-25	3-10
Cracking stills, complete	15	4-10
Cracking stills, piping	..	2.5-4
Cracking stills, condensers	..	3-8
Catalytic cracking plants	..	5
Compressors	..	6-16
Distillation stills, fire	15	....
Distillation stills, steam	20	7-12
Distillation stills, vacuum	20	7-12
Distillation stills, pipe or tube	15	7-12
Electric plant	..	36
Exchangers	20	4-16
Filtering plants	25	....
Gasoline plants, natural gasoline	15	12.5
Laboratory equipment	..	3-5
Loading racks	..	10-13
Office furniture and equipment	..	10
Pumps and compressors	20	6-16
Piping, interunit lines, small	25	4-14
Pipe lines, short	..	10-15
Sewage and traps	25	20-25
Trucks and automobiles	..	3-4
Tanks, field	..	10
Tanks, compounding	30	....
Tanks, stock or rundown	..	10-20
Tanks, storage	30	20-33
Tanks, treating	20	7-16
Tools, hand	..	2.5-7
Tools, shop or machine	..	7-12
Towers	20	16
Wax plants	25	20
Refinery—complete	25	....

REFINERY AUXILIARIES—APPROXIMATE* USEFUL LIFE IN YEARS[1]

Air conditioning, or refrigeration, small	10-11
Buildings, construction	None
Buildings, garage, shops or dwellings	33-50
Buildings, office	33-67
Buildings, warehouses	40-67
Boilers	14-25
Boilers, waste heat	30
Caustic tanks	18-25
Compressors, small	10
Compressors, large	20-25
Construction equipment:	
Buildings	10
Road	6
Construction machinery:†	
Blacksmith, portable	4
Boilers, portable	15-20
Bulldozers	4-8
Compressors	5-10
Concrete mixers	3-8
Cranes, excavators, hoists	4-12
Jacks	3-8
Gin poles	10
Hose or steam shovels	5-10
Tractors	3-10
Road oilers	8-10
Wheelbarrows	2
Winches	10
Electrical, wiring	20-25
Electrical, distribution	22-40
Electrical, machinery	17-20
Engines, gas or oil	10-15
Engines, steam	15-20
Fences, woven wire	15-25
Fences, wood and wire	12
Fire protection, equipment	10
Fire extinguishers	3
Gas, utilities, distribution:	
Mains	80
4-in. and smaller	30-50
Miscellaneous	33-40
Ice plants	22
Insulation, cold	20
Insulation, hot	15
Lighting, building	15-20
Office, fixtures and files	20
Office, equipment, mechanical	8
Pavements, concrete	20
Pavements, asphalt or macadam	15-20
Plumbing, building	15-25
Power, steam:	
Boiler plant	28
Structures and improvements	50
Shop machinery:	
Auto repair	10
Blacksmith	20
Machine	20-25
Woodworking	25
Stacks, brick	40
Stacks, steel	20-35
Sulfuric acid:	
Pumps and blowers	5-10
Tanks	17-20
Tank cars	12
Tank cars	20-30
Telephone equipment	20
Vehicles:	
Automobile	3-4
Tractors and trailers	6
Trucks, light	4
Trucks, heavy	8

*Taken mainly from Bulletin F[1], but not listed directly under the heading of refining.

†Construction equipment kept in a plant may last longer than shown here.

References

1. Bur. of Internal Revenue, Income Tax Depreciation and Obsolescence, Estimated Useful Lives and Depreciation Rates, Bull. F., U. S. Treasury Dept., Jan. 1942.

2. Petroleum Refinery Engineering, 3rd Ed., McGraw-Hill Book Co., New York, 1949.

3. Nelson, W. L., Amortization and Depreciation Rates, The Oil and Gas Journal, Feb. 3, 1949, p. 90.

No. 19 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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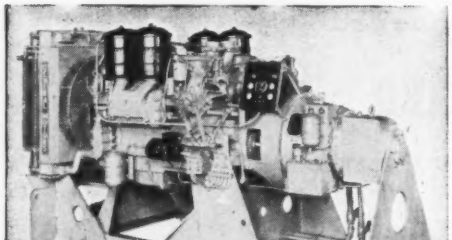

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THE OIL AND GAS JOURNAL
TULSA **OKLAHOMA**

PIPE LINES

Early Construction on 4,000 Miles of Lines

PROJECTS involving approximately 4,000 miles of big-inch pipe lines—more pipe-line mileage than at the start of any previous year—are now being discussed by pipe-line companies. Since discussions by these various companies point to letting of contracts soon, greater efforts than usual are being made to prepare for the great demands for equipment and skilled personnel, which are immediately in sight for 1949.

Transcontinental Gas Pipe Line Corp. is reported planning to have approximately six spreads in the field this year for building 1,839 miles of 20-30-in. main line for the company's 2,250-mile project which will be in progress through the 1949-50 period.

Bids have been taken but contracts have not yet been awarded for Pacific Gas & Electric Co.'s 510 miles of 30 or 34-in. from Topock, Ariz., to Milpitas, Calif.

Other projects for contracting early this year include the following: Atlantic Seaboard and Virginia Gas Transmission Co., 268 miles, 24-in., Clendenin, W. Va.-Rockville, Md.; Mississippi River Fuel Corp., 221 miles of loop, Monroe, La.-St. Louis, Mo.; Northern Natural Gas Co., 185 miles of line (127-mile, 20-24-in., loops, and 58 miles of 4-24-in. gathering lines); Texas Empire Pipe Line Co., 197-mile, 18-in., Patoka-Wilmington, Ill.; Texas Gas Transmission Corp., 663-mile, 26-in., Lisbon, La.-Middleton, Ohio.

In addition to this work just mentioned, El Paso Natural Gas Co. has authorized 280 miles of 24, 26, and 30-in. loops and extensions which will be built by the company's construction crews. Tennessee Gas Transmission Co. is reported to be making early plans for laying 140 miles of 30-in. loops in Louisiana, Mississippi, and Tennessee.

Contracts have been let lately for Texas Pipe Line Co.'s 54-mile, 22-in., Wood River-Patoka, Ill., line and for Buckeye Pipe Line Co.'s 82-mile, 22-in., Lima-Toledo, Ohio., line.

Large projects undertaken in 1948 which are included in 1949 construction projects include: Atlantic Pipe Line Co., 382-mile, 10-in., Refugio-Crane, Tex.; Ozark Pipe Line System, 435-mile, 22-in., Cushing, Okla.-Wood River, Ill.; and Michigan-Wisconsin Pipe Line Co., 455-mile, 24-in., Hansford County, Tex. - Marysville, Mo., as the initial section of 1,548-mile project to serve Detroit and Milwaukee.

Early this year a total of approximately 9,360 miles of line were in process of construction; of these 4,100 miles were in the United States and 5,260 miles in foreign countries. Lines planned for future construction in the next few years totaled 30,300 miles (23,600 miles in the United States and 6,700 miles abroad). Lines planned or under consideration for the United States were 4,350 miles for crude oil; 950 miles for refined products; and 18,300 miles natural gas. Pipe lines completed in the United States and abroad for crude oil, products and natural-gas service totaled 10,250 miles.

Columbia's 1948 Expansion Cost Exceeds $51,000,000

Columbia Gas System, Inc., spent $51,513,267 for construction of facilities and for its gas-storage program in 1948, involving 256 miles of transmission lines for affiliated companies including revamping of Atlantic Seaboard Corp. trunk line; laying of more than 30 miles of 20-in. in Ohio and West Virginia by United Fuel Gas Co.; 60 miles of 10, 12, and 14-in. by Home Gas Co., and 158 miles of 4 to 14-in. by Manufacturers Light & Heat Co.

The principal project built in 1948 was the 122-mile, 14-in. line from Coatesville, Pa., to Port Jervis, N. Y. In 1949 the system's major undertaking will be construction of the 268-mile, 24-in. Clendenin, W. Va.-Rockville, Md., line for deliveries to Washington Gas Light Co. for distribution in the Washington, D. C., area.

Ultimately, probably in 1950, Columbia Gas System plans to expand its radio communication network to include 80 fixed-land stations and 300 mobile units. By the end of 1948, two-way radio equipment had been installed on 96 trucks and cars and at 15 land stations at strategic points of the system.

In 1948 the system delivered 264,000,000,000 cu. ft. of gas. Present contracts and commitments provide for ultimate delivery from trunklines from the Southwest which will amount to 875,000,000 cu. ft. daily into the Columbia system. At the end of 1948, gas from the Southwest was received by Columbia at a rate exceeding 525,000,000 cu. ft. daily.

On November 1, 1948, Columbia had in underground storage over 64,000,-

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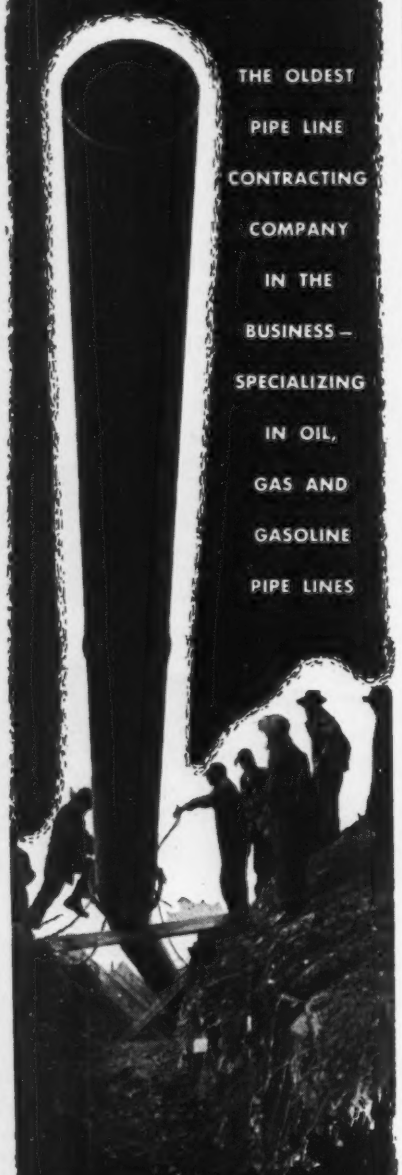

OKLAHOMA CONTRACTING CO., Inc.

MERCANTILE BANK BLDG.
DALLAS 1, TEXAS

000,000 cu. ft. as compared to 47,000,000,000 cu. ft. at the same time in 1947.

The Columbia system pipe lines of all classes were increased by 661 miles in 1948, including 20 miles of field lines, 256 miles of transmission lines, and 485 miles of distribution lines. At the end of 1948 the Columbia lines totaled 31,463 miles, including 5,236 miles of field lines, 14,110 miles of transmission lines, and 12,117 miles of distribution lines.

Columbia changed its name in April 1948 from Columbia Gas & Electric Corp. to Columbia Gas System, Inc., following the sale of all electric properties. In November the New York office was moved from 61 Broadway to 130 East 41st Street.

Buckeye Lets Contract for Lima-Toledo 22-In. Line

Buckeye Pipe Line Co. has awarded contract for construction of the 82-mile, 22-in. Lima-Toledo, Ohio, crude-oil line to Anderson Brothers Corp. It is reported that pipe laying is to start about the middle of April.

The Somastic division, H. C. Price Co., has already coated 40 miles of the pipe for this project at a plant which has been operating near the pipe-line route.

Poza Rica Line Laid by Pemex to Mexico City

Welding and laying operations have been completed for the construction of 150 miles of 20-in. natural-gas line from the Poza Rica field to Mexico City. This project was built for Petroleos Mexicanos under contract by Williams Brothers Co.

The contractor's operations have been carried on under H. L. (Red) Davis, superintendent, and J. H. Williams, resident manager. Following completion early this month, the line is now being tested in preparation for being put in operation for transmission service. It is expected that distribution lines will be laid in Mexico City this year.

Northern Natural to Lay 223 Miles of Line in 1949

Northern Natural Gas Co. is planning to increase the capacity of its system north of the Kansas-Nebraska state boundary from 425,000,000 to 470,000,000 cu. ft. daily. This program will entail the laying of 223.25 miles of pipe line in 1949 for loops and field-gathering lines.

The 137.25 miles of loops include the following: 116.11 miles of 24-in.; 9.11 miles north of the Clifton, Kans., compressor station; 29.5 miles northeast of Palmyra, Neb. station; 17.8 miles, northeast of Oakland, Iowa, station; 21.95 miles north of Ogden, Iowa, station; 26 miles north of Ven-

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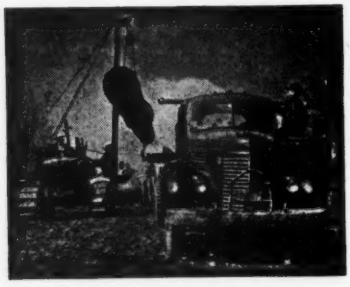

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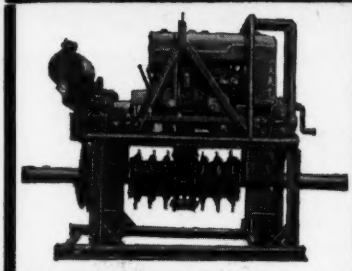
MODEL M
CLEANING MACHINE



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with Crose pipe cleaning machines. Machines designed for pipe sizes from 2" to 30" diameter. Equipped for stationary or traveling operation. The machines with independent speed control on travel and priming head.

Available in 3 Models:
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Model KX—30" to 34" pipeline machine

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PIPE LINE
CONSTRUCTION

tura, Iowa, station; and 11.75 miles between Farmington and Minneapolis, Minn. The 1949 program also includes 21.14 miles of 20-in. north of Palmyra, Nebr., station.

Field lines to be laid in 1949 will approximate 86 miles of pipe of diameters from 4½ to 24-in.

Compressor facilities will be enlarged by the installation of seven 1,600 hp. horizontal units at stations indicated as follows: two units, Sublette, Kans., two at Mullinville, Kans., one at Bushton, Kans., one at Clifton, Kans., and one at Palmyra, Neb.

FPC Hearing March 7 on Indianapolis Application

Hearing on application of the city of Indianapolis, Ind., asking Panhandle Eastern Pipe Line Co., or Texas Eastern Transmission Corp., to permit connection with natural-gas transportation facilities, will be held March 7 in Washington, D. C.

The application, filed July 14, 1948, also proposes that FPC require delivery or sale of 10,000,000 cu. ft. of gas daily to the city by one or more of the companies.

A pipe-line connection as the outcome of this FPC hearing would give Indianapolis its first natural-gas deliveries from a major trunk-line system. The Panhandle Eastern Pipe Line system under construction in 1930 has a compressor station at Zionsville, Ind., approximately 20 miles northwest of Indianapolis. The Big Inch and Little Big Inch systems were completed for crude oil and products service in 1943; the Seymour, Ind., pump stations, 55 miles southeast of Indianapolis, were converted to compressor-station operation within a few months after these former War Emergency Pipelines, Inc., systems were acquired by Texas Eastern Transmission Corp. in 1947.

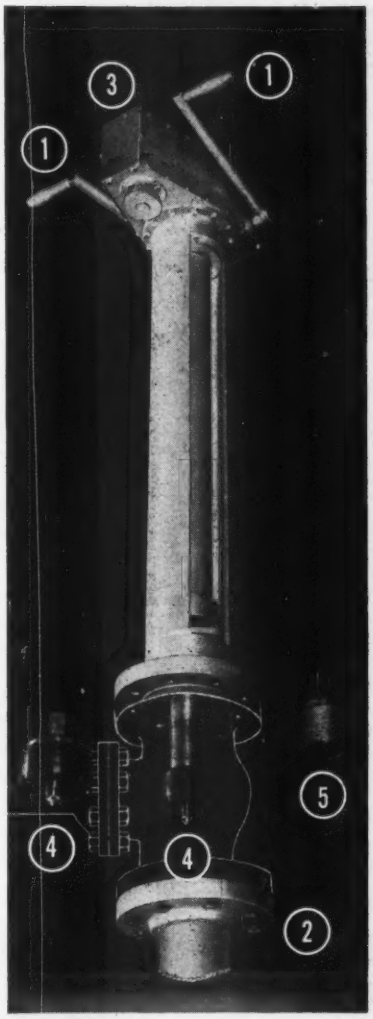
Stanolind Gets Permit

Stanolind Pipe Line Co., Tulsa, has been issued a $2,000,000 building permit for the company's new building, located at Sixth and Cincinnati in Tulsa. The building is well under way, with practically all steel work completed. The structure will be six stories high, and is being constructed so that more floors can be added later as needed.

Hearing Is Postponed

Federal Power Commission has postponed to April 4 hearing previously scheduled March 1 involving investigation initiated by the commission of rates charged by United Natural Gas Co., which operates a transmission pipe-line system in Pennsylvania and Ohio, for sale of natural gas subject to FPC jurisdiction. Rate investigation was opened by FPC order in December 1948.

PIPE LINE TAPS
Made
EASIER . . . SAFER
-With-
HILLCO Model 600
TAPPING MACHINE*



FEATURES—
2,000 p.s.i. test pressure.
Maximum tap: 6" standard (8" special).
Power: air motor or manual—dual cranks (1).
Flanged (or threaded) Tapping Nipple (2), welded to pipe line.

Automatic feed (3), protects shell cutters (4).
Pilot Drill (4), holds "coupon" in shell cutter.
Nipple Plug (5), permits removal of tapping valve . . . an exclusive feature.

*Patent No. 2,097,398
Other Patents Pending.

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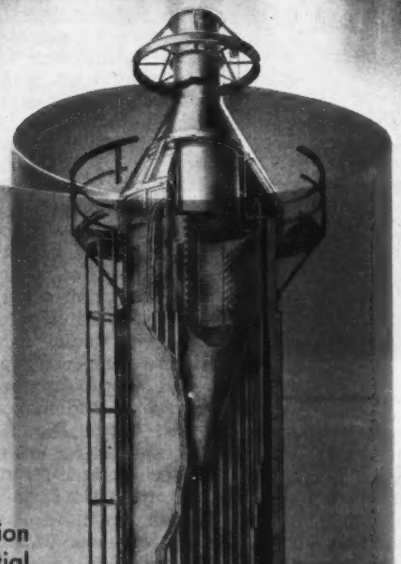
Uniform heat distribution per pass being a most important essential to efficient operation of multi-pass furnaces, it is significant that Petro-Chem Iso-Flow Furnaces are unequaled for uniform heat distribution per pass because their cylindrical design and vertical tubes provide a perfectly symmetrical pattern on the fluid and combustion sides, regardless of the number of passes required.



Each bank of tubes (each pass) is equi-distant from the flame.

●

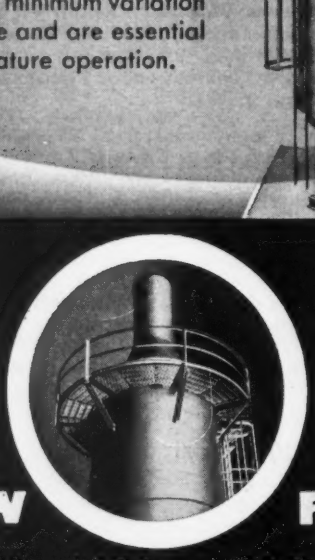
Each bank of tubes (each pass) is exposed to the same heat intensity.

●

Length of fluid travel for each pass (including crossovers) is identical from inlet to outlet.

●

All of the above give the minimum variation in tube wall temperature and are essential for critical high temperature operation.



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REFINING

Koppers Co. Buys Rochester Liquid Asphalt Facilities

Koppers Co., Inc., Pittsburgh, has purchased the plant and equipment of Michael E. Sweeney Corp., Rochester, N. Y., a firm which manufactures asphalt pre-mixed road materials, and applies liquid asphalts used in road construction and maintenance. Michael E. Sweeney will continue as manager of the operation for Koppers.

The company did not reveal consideration of the purchase, but Koppers will take immediate possession of the plant.

The plant becomes the twenty-third to be operated by Koppers' tar-products division, and the third in New York state. Other New York tar products division plants are located at Buffalo and Utica.

Project May Answer Many Gasification Questions

An experiment conducted jointly by U. S. Bureau of Mines and Alabama Power Co., near Gorgas, Ala., should supply answers to many questions concerning feasibility of underground coal - gasification, for cheap power to turn raw materials into systhetic fuels. The project, second to be sponsored jointly by the Bureau of Mines and Alabama Power, has now been fired, and its operation in the future is expected to give engineers data on the following:

1. Determination of the quantity of coal that can be gasified from a given combustion zone, and the shape and extent of the burned-out area formed.
2. Determination as to whether fixed outlets for product gas are practicable, either at the outcrop of the coal bed, or at vertical boreholes. (Various designs of inlets, outlets, and seals will be tested).
3. Determination of quality and quantity of product gas generated with an air blast under experimental conditions, and quantity of tar and related products obtained.
4. Determination of operating characteristics of the installation under a variety of conditions.
5. The procurement of fundamental technical and economic information concerning plant sites, installations, and operating processes.

The initial field-scale experiment was carried on in the summer of 1947, and showed that gases produced by burning unmined coal offer a potentially cheap source of fuel for electrical power and raw materials for synthetic liquid fuels. Underground gasification also holds possibilities for utilizing coal beds difficult or uneconomic to mine.

Results of the first experiment were promising, the bureau reported, for it was demonstrated that combustion could be maintained and controlled, that coal in place could be gasified completely, and that roof rock would become plastic and settle down behind the burning-coal face without cutting off the air or gas. Owing to leakages through the thin (30-ft.) cover over the burning-coal seam, product gas obtained was of lower heating value than desired. To correct this fault, the new experiment is being carried out at a deeper level, from 60 to 125 ft.

Production Started at New Gulf Chemical Co. Plant

Production of phosphoric acid and various other sodium and calcium phosphates is under way at the new Gulf Chemical Co.'s $1,500,000 phosphate manufacturing plant on the ship canal south of Galena Park, Tex. Products will be used in the treating of rotary drilling muds and as a corrosive inhibitor for the protection of oil-field tubing and casing.

The plant is situated on a 19-acre tract formerly known as the old Turning Basin Development Co. property. Gulf Chemical also owns 7 additional acres adjoining the site which has been acquired for future expansion.

Refinery Technology, Theme Of W.P.R.A. Meet Mar. 28-30

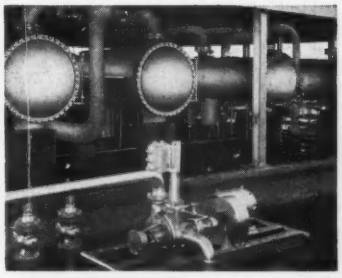
The thirty-seventh annual meeting of Western Petroleum Refiners Association, to be held March 28-30 in San Antonio, has been designed to cover trends and developments in refinery technology, John C. Day, executive secretary, Tulsa, announced.

The association's marketing committee has completed arrangements for the technical program, the papers to be heard during the 3-day meeting will include such subjects as: "Houdriflow Catalytic Cracking," "Hydroforming," "Fuels and Lubricants for Jet-Propelled Aircraft," and "Storage Stability of Cracked-Fuel Oils."

Dr. Edwin F. Nelson, vice presi-

EXCEL-SO

Separators remove water, scale and rouge for Magnolia Pipe Line Company



Two model HP-750 and two HP-1000 Excel-So Separators at Hebert Products Pipe Line Station.

The two 750 gallon units are on the incoming side and the two 1000 gallon units are on the suction side of the main line pumps. These units handle both gasoline and kerosene. All four separators are successfully taking out all appreciable water in addition to removing all appreciable scale, oxides, rouge, etc., that are detrimental to the pumps and other equipment.

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CHEMICAL MEASURING
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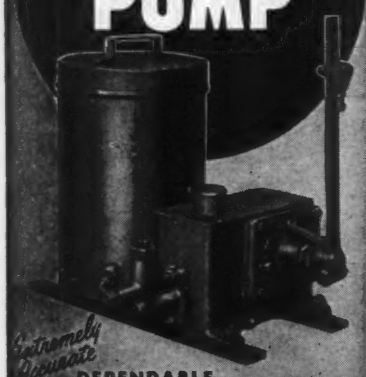

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Accuracy of delivery in McCord chemical pumps is the result of a finely engineered design with a minimum number of parts. Dependability is insured because working parts are fully enclosed, protected from dirt and the elements. Specify McCord. For sale by National Supply Co.
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WELDING PROBLEMS SOLVED
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"Eutectic Low Temperature Weldrods" can solve all your welding problems by joining metals at low heat . . . avoiding distortion, stress, warping or overheating.
Over 100 Alloys
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Special Low Heat EutecTrodes for the Oil Industry:
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40 Worth Street, New York 13, N. Y.
Chicago, Cincinnati, Cleveland, Dallas, Detroit, Los Angeles, San Francisco, etc.
160 Field Engineers to Help You
America's Welding Alloy Specialists

dent, Universal Oil Products Co., Chicago, will lead a discussion at the Wednesday, March 28, session on "Trends in the Refining Industry."

Midwest Power Conference In Chicago April 18-20

The Midwest Power Conference, sponsored by Illinois Institute of Technology, will be held at the Sherman Hotel in Chicago April 18-20, with various technical papers on refining processes included in the agenda.

The conference was reorganized in 1938 as a cooperative institution with university and technical society associations, and purpose has been to offer an opportunity for all persons interested in power reduction, transmission or consumption, to study together mutual problems free from the restrictions of required membership in technical organizations.

R. A. Budenholzer is conference director.

Gasoline Storage Supplies Reach New All-Time Peak

Storage supplies of gasoline continued to spiral upwards at the week ended February 12, and American Petroleum Institute reports that for the third time in as many weeks, reserve stocks have reached a new all-time peak.

Reports received from the refining companies showed that the industry produced 17,754,000 bbl. of gasoline during the week ended February 12, raising the storage total to 119,780,000 bbl. of 42 gal. each.

A.P.I. reports that this is an increase of 2,611,000 bbl. over the preceding week's record reserve, and represents an increase of more than 12,000,000 bbl. over the same period of last year.

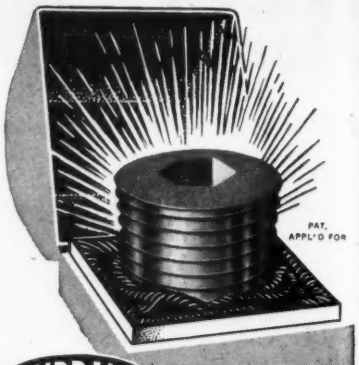
Bureau of Mines Issues Paper on Synthetic Fuels

Published information on production of synthetic liquid fuels by the Fisher-Tropsch process, and U. S. Bureau of Mines research on catalysts used in the process, is available in a new technical paper released by the bureau, according to James Boyd, director. The paper is for sale by the Superintendent of Documents, U. S. Government Printing Office.

The publication reviews research in Germany where the Fischer-Tropsch process originated in 1913. It also discusses the industrial development of hydrogenation of carbon monoxide in that country and in Japan, Great Britain, Italy, Australia, Scotland, Spain, Canada and the United States.

The report is illustrated, and is known as Technical Paper 709.

New and Exclusive



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PRESSURE PLUGS
These entirely new and exclusive precision-made plugs—for water, steam, air, oil and hydraulic pressure—are fully formed with the roundness and concentricity so desirable in a plug. Tests have proven that they materially reduce leakage on some applications and eliminate it entirely on others.
"Unbrako" Plugs—made by the manufacturer of the famous "Unbrako" Socket Screw Products—are available in National Pipe Thread sizes from 1/16" to 1¼". Write for detailed information and samples.
OVER 46 YEARS IN BUSINESS
STANDARD PRESSED STEEL CO.
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OIL AND GAS
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Rustrem paints right over rust. For stacks, fire escapes, bridges, fences, flashings, all metal. Farm, auto, marine, machinery. Black and aluminum.

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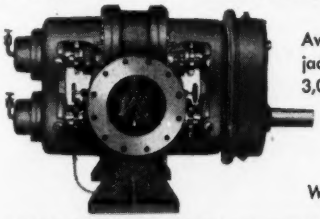
GIVE RELIABLE SERVICE!

The dependable performance of Kinney Heliquad Pumps is one of the big reasons why they receive outstanding acceptance throughout the petroleum industry. Steep helical rotors within the pumping chamber handle all grades of petroleum oils and fuels — provide positive displacement and steady, non-pulsating flow — pump either viscous or non-viscous liquids, hot or cold. Anti-friction bearings and hardened steel timing gears assure long-lived operating efficiency. On every petroleum service — in the field, refinery, or bulk plant — choose Kinney HQ Pumps for reliable service.



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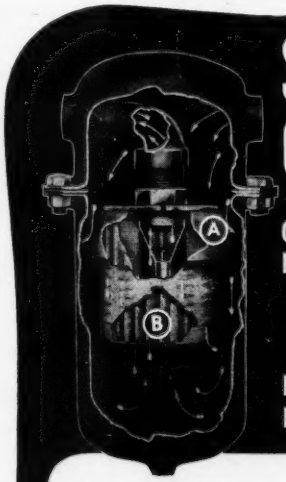

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Principle Guarantees both CLEAN & DRY gas

Removes injurious pipe scale, rust, dust, dirt, water and other foreign matter from artificial or natural gas. Filter employs both mechanical separation and filtration. Deflector cup (A) directs gas to walls of housing, thence to base where heavier particles and liquids are deposited. Gas then rises thru exclusive Radial Fin Insert (B) where lighter particles are removed. Use steadily increasing in petroleum industry.

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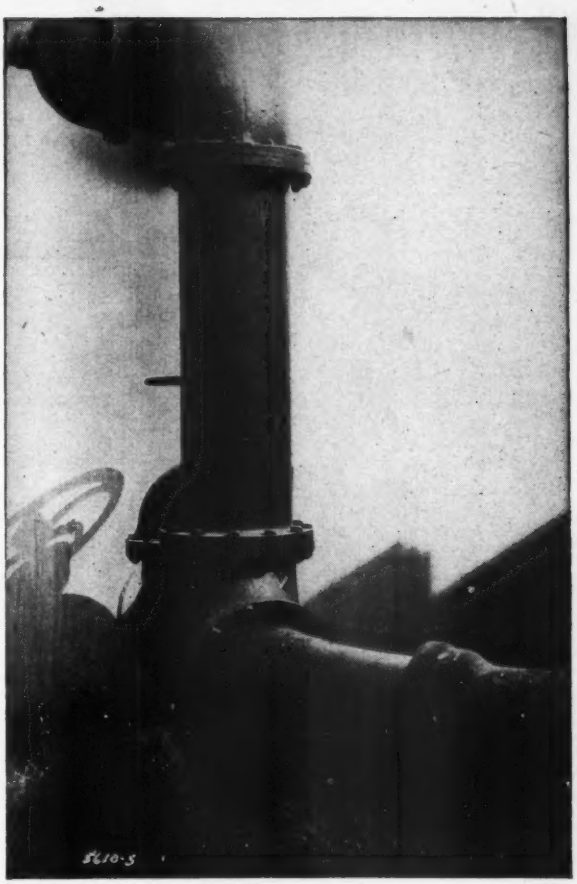
COMPLETE DATA ON REQUEST



AN ALLY IN THE BATTLE OF MAINTENANCE COST

Oil refinery operation is known for close control of maintenance cost. One of the factors in keeping this cost low is the dependable, durable service of cast iron pipe.

For such refinery services as salt water disposal, cooling and condensing coils, rundown lines, discharge lines, and water and fire protection lines, the cost of cast iron pipe per service-year is low. Measured by that *real* cost, it is cheapest in the end. Available in bell-and-spigot, plain end or flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

CAST IRON PIPE

FOR LONG LIFE AND ECONOMY

with the ease of a man on the flying trapeze

The derrickman will have a circus in handling the Web Wilson Center Latch Drill Pipe Elevator.

TYPE CC CENTER LATCH SAFETY LOCK ELEVATOR

AUTOMATIC SPRING OPENING—Automatically opens elevator when latch is opened—gives proper balance when open—throws elevator away from pipe when latch is opened.

SLANTING HINGE PIN—Automatically closes elevator when load is applied—assures positive latching—minimizes load on latch.

SAFETY LATCH—One motion releases latch lock and opens latch—lock closes automatically when elevator is applied to pipe.

AVAILABLE in 100, 200 and 300 ton capacities with 4 to 1 safety factor—for both collar and tapered type drill pipe.

WEB WILSON Oil Tools INC. *It's a Wilson!*

W. W. Wilson Bldg., Huntington Park, California

Among the

Drilling Contractors

Gain Shown in Number of Active Rotary Rigs

A reversal of the previous downward trend in the number of active rotary rigs in the United States and Canada shows up in figures released by the Interstate Oil Compact Commission. An increase in the number of operating rigs during the first 2 weeks in February, particularly in the Oklahoma and Kansas areas, as well as in the West Texas and New Mexico area, indicates the effect adverse weather conditions had on oil-industry activities.

Totals by areas as of February 14 are as follows:

	Feb. 7	Feb. 14
Pacific Coast	186	190
Oklahoma, Kansas	291	328
Rocky Mtn. (including W. Canada)	165	165
Ark., La., Tex.	160	156
West Texas, New Mexico	470	524
Gulf Coast	567	572
Illinois	92	100
Total	1,931	2,035

Simonis Heads California A.A.O.D.C.

E. J. Simonis, Santa Maria Drilling Co., has been elected chairman of the California chapter of the American Association of Oilwell Drilling Contractors for 1949. M. H. Stansbury was selected as vice chairman and Lee Danial was named secretary.

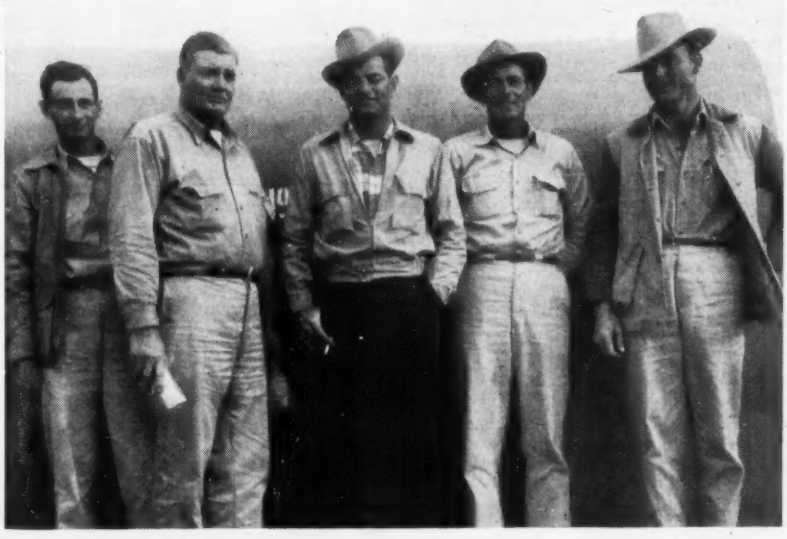
New Drilling Firm Formed

James Doughty, R. L. Kirkwood, and J. A. Morgan have announced the formation of a new corporation, Rincon Drilling Co., operating drilling rigs in Southwest Texas and the Rio Grande Valley. Doughty was formerly vice president of Southern Minerals Corp. and was with that company 11 years. Kirkwood and Morgan are partners in Kirkwood & Morgan, Inc., with offices in Alice, Tex.

Commonwealth Drilling Co. is starting Home Oil-Leduc 13 in LSD 4, 9-50-26w4, about ¼ mile east of No. 9 D3 zone producer in Calgary, Alta, Canada.

Adkins Drilling Co. is drilling Continental Oil Co. 4 McCullough, a 5,000-ft. test in Barber County, Kansas.

Olson Drilling Co. will drill Shell Oil Co., Inc. 1 Walters B, C SE SE 15-10n-21w, in Elk City field, Beckham County, Oklahoma.



Crew of L. D. Cain Drilling Co., Rig No. 4. The location is Gulf Oil Corp. 3 J. Settegast on south flank of Pierce Junction field, Harris County, Texas. C. D. Musgrove, floorman; C. S. Martin, fireman; J. H. Ditto, floorman; Eli Wheeler, derrick man; T. J. Burnett, driller

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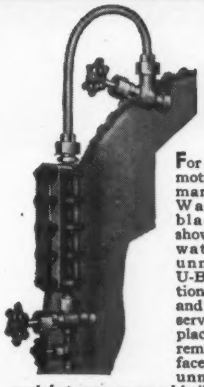

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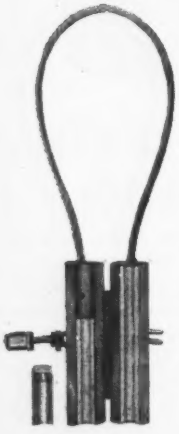

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Crow Drilling Co., Inc. Shreveport, La.

Crow Drilling Co., Inc., was organized by R. H. Crow, formerly drilling superintendent for Haynes Drilling Co. During the war 14 drilling rigs were operated by the company in the Mid-Continent area. In the early offshore drilling days the company operated a Gulf Coast district where several interesting tests were drilled. The main office of the firm is at 422 Commercial National Bank Building, Shreveport.

R. H. CROW

Equipment.—One 12,000-ft. steam rig operating in the Baxterville, Miss., area; one 7,500-ft. and one 10,000-ft. power rig operating in the Cairo, Ark., area; one 7,500-ft. power rig operating in Hopkins County, Texas; one 5,000-ft. rig in Spirit Lake, Ark., area; and one 7,000-ft. power rig in Ouachita County, Arkansas.

Personnel.—R. H. and David Crow, owners; Austin G. Robertson, secretary-treasurer; J. D. Madole, J. H. Blakemore, Leo Boland, J. E. Senter, and Dail Hughes, drilling superintendents.

Sidelights.—R. H. Crow has pioneered in the use of jackknife type derricks and has built several of his own design. He has drilled the discovery wells of the Spirit Lake area, Lafayette County, Arkansas, and the Stephens Smart area, Columbia County, Arkansas. The firm drilled Coastal Petroleum Co.'s first Florida well near Cedar Keys, Fla., and also drilled several interesting tests for Magnolia Petroleum Co. near Appalachicola, Fla. Oil production is held in the name of the company owners in Stephens Smart, Spirit Lake, and Tri-Cities fields.

Smiley & Little Drilling Co. has contract for A. Ben Caldwell 1 Stewart, NE NE NW 15-29n-4e, northeast of Newkirk in Kay County, Oklahoma.

Kemp Drilling Co. has been awarded contract to drill a 10,500-ft. exploration for Sohio Petroleum Co.-Sinclair Prairie Oil Co. in the Sunshine discovery area of Iberville Parish, South Louisiana. The test, B-2 Harry B. Nelson, is located in 1-9s-1w.

Woods Drilling Co. will drill Toklan Production 1 Black, NE SE NE 3-16n-1e, a wildcat east of the Iconium pool in Logan County, Oklahoma.

Norwood Drilling Co., Wichita Falls, Tex., was moving in equipment to drill Republic Natural Gas Co. 1 J. C. Sartin, lower Permian exploration, 2½ miles northwest of Seagraves in Yoakum County, West Texas. Location is Section 19, Block C-34, public school lands, and 10 miles east of Wasson field.

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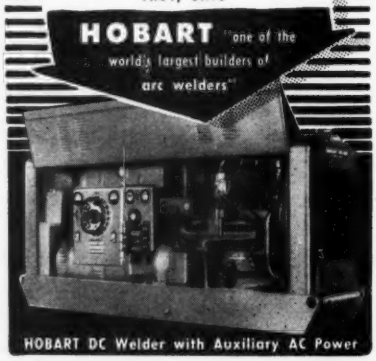

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NATURAL GAS

Rules Amended by FPC On Filing of Applications

FEDERAL POWER COMMISSION has adopted three amendments to its general rules and regulations, which should simplify and clarify procedures followed by the commission with respect to minor or temporary changes in the operating facilities of natural-gas companies, and the commission disclosed the amendments will be effective immediately.

First of the new rules, by defining the term "facilities" as used in Section 7 (c) of the Natural Gas Act, makes it possible for natural-gas companies to construct certain types of minor changes in existing systems without necessity of seeking a certificate of public convenience and necessity from the commission. Types of construction included in this new rule include: auxiliary installations which are installed for purpose of obtaining more efficient or more economical operation of authorized transmission facilities; replacement facilities which do not appreciably change the daily-delivery capacity of an existing pipe-line system; and metering and regulating installations and branch lines necessary for establishment of new-delivery points required for delivery of gas to existing customers for resale in a local community, presently served from the same pipe-line system.

The second rule states that issuance of temporary certificates of public convenience and necessity is limited to cases where applications for permanent certificates are pending, and temporary authorization involves only such minor extensions and interconnections as may be necessary to assure maintenance of adequate service, or to serve particular customers.

Rule 3 exempts from the certificate requirements of the act temporary construction and operation of facilities necessary to assure maintenance of adequate service during emergencies, such as: failure of equipment, or failure of supplies. However, FPC reports that this temporary operation is limited to a period of not more than 60 days, and all facilities constructed for such an emergency must be removed after discontinuance of use, unless appropriate application subsequently is made for a certificate.

Companies engaged in temporary operations are required to file notice with the commission within 10 days after commencement with a statement explaining the purpose of the operations, FPC said. In addition, a notice of a discontinuance must be filed within 10 days following end of operations, and notice of removal of facilities is required within 10 days.

FPC announced in November 1948 that in order to assure uniformity and simplicity in the form and composition of schedules throughout the industry, it was amending, effective December 1, 1948, rules governing filing of tariffs of natural-gas companies subject to FPC jurisdiction.

Royalty Established on Underground Gas Storage

Adoption of a policy which will make available to any prospective user of a new system for the underground storage of natural gas under high pressure has been announced by its inventors, D. V. Meiller and M. G. Markle, associated with Public Service Co. of Northern Illinois. The policy permits users of the system a license under the inventors' patent rights, at a low uniform royalty rate.

The royalty basis will be 60 cents per 1,000 cu. ft. of gas storage capacity, and licenses will be granted to any responsible parties wishing to install or have installed a high-pressure gas storage system covered by their pending patent application, the engineers said. The system already has been used successfully in installations having a capacity of more than 95,000,000 cu. ft. of natural gas.

Orifice Meters to Benefit Industry, A.G.A. Predicts

Benefits to the natural-gas industry through improved accuracy of orifice meters are anticipated as a result of a new project approved by the PAR committee of the American Gas Association, the association announced recently. Work is designed to develop further information on installation requirements of orifice meters with particular attention to effects on measurement of plug valves, globe valves, elbows between valve and orifice, sizes of pipe in orifice-meter runs, and pipe roughness.

The new project, entitled "Investigation of Installation Requirements of Orifice Meters," is sponsored by technical and research committee of A.G.A.'s natural-gas department, with E. F. Schmidt, Lone Star Gas Co., Dallas, as chairman.

Oral Arguments Underway On Proposed Gas Lines

Federal Power Commission opened further hearings and oral arguments February 21 on applications of El Paso Natural Gas Co., El Paso, Tex., and Pacific Gas & Electric Co., San Francisco, which are seeking authority to construct and operate natural-gas transmission facilities in the Southwest.

El Paso is seeking FPC authorization to construct facilities to transport and sell gas to Pacific Gas & Electric. P.G.&E. plans to construct 506 miles of line, extending from the California-Arizona border to its terminal near Milpitas, Calif., for transportation of gas purchased from El Paso.

Gas Royalty Sought

Oklahoma State School Land Commission has selected a casinghead gas royalty claim of $66,800 against Cities Service Oil Co., as a test case to be tried in district court, to determine possibility of collecting more than $312,000 alleged due from several firms for such production. John W. Prigmore, hired to audit casinghead gas royalty payments to the state, will begin an investigation soon.

Natural Gasoline

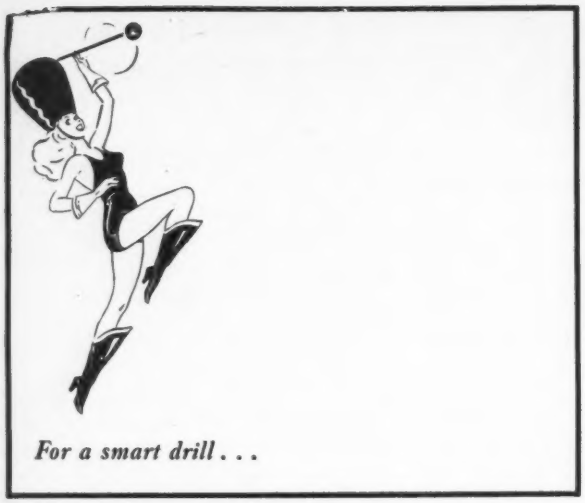
Magnolia Awards Contract For Natural-Gasoline Plant

Contract for construction of a natural-gasoline plant in Sholem Alechem field in the eastern part of Stephens County, Oklahoma, has been awarded to Jones & Laughlin Co., Tulsa, by Magnolia Petroleum Co., Dallas. The plant will be located on the A. L. Sims lease, a 40-acre tract in SW SE 2-1s-4w, about 2 miles southwest of Tussy, Okla.

Initial installation of compressors will be capable of processing 22,000,000 cu. ft. of casing-head gas daily, with designs for ultimate processing of 30,000,000 cu. ft. daily.

In addition to the manufacture of natural gasoline, the plant will also make butane and propane, and is designed for a total production of approximately 75,000 gal. per day of liquid-hydrocarbon products. All residue gas not used for the plant and lease fuel will be sold for pipe-line transportation to commercial markets.

The project is a joint operation with Magnolia as plant operator for the group of nine companies and nine individuals. It is estimated the plant will be in operation by January 1, 1950.



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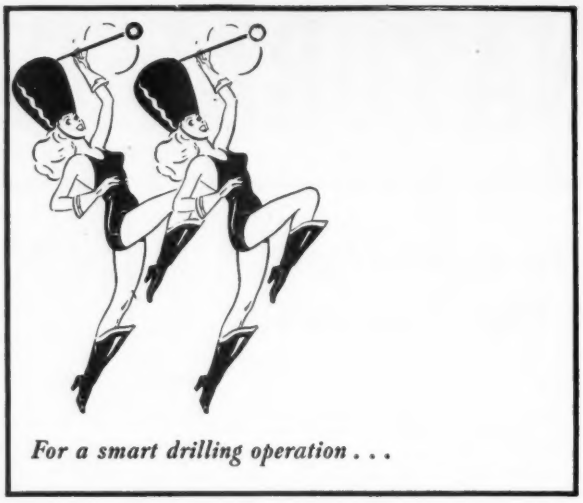

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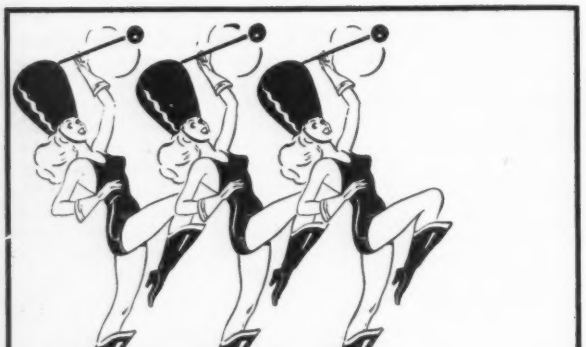

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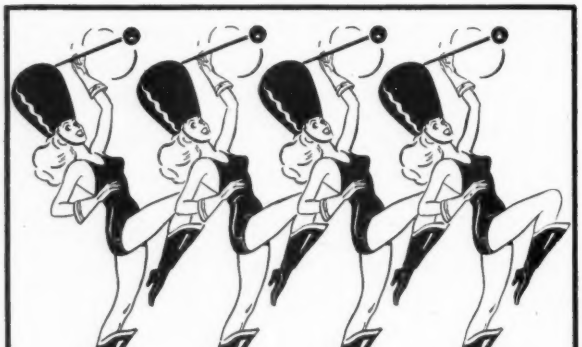

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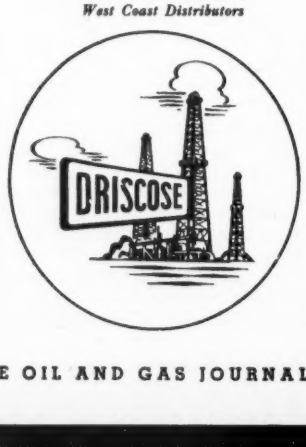

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Exploration and Drilling

Elk City Field May Get 3-Mile East Extension

ELK CITY field was drawing the attention of all Oklahoma and the Texas Panhandle operators, as they waited on final tests of Max Pray et al 1 Proctor, C NW 28-10n-20w. If successful, this well will extend the field 3 miles east, and give it a northwest-southeast length of about 6 miles.

The 1 Proctor was originally drilled by Continental Oil Co., and completed dry in 1939 at 14,582 ft., and shut in after plugging back to test at 10,760-11,186 ft. Elevation is 1,890 ft. Max Pray et al reopened the old well recently, and washed out the 7-in. casing still in the hole to 10,650 ft. After setting a plug at 9,707 ft. inside the casing, they perforated with 200 holes at 9,655-9,705 ft. A drill-stem test showed wet gas, gas-cut mud, and oil-cut mud. Now further tests are to be made, with plug at 8,648 ft.

As the field now stands, Shell Oil Co., Inc., has three producers, and a well drilling that is a 1½-mile northwest stepout. The producers are in NE SW 15-10n-21w, NE SW 14-10n-21w and NE SW 23-10n-21w. The stepout test is drilling in NE SW 9-10n-21w. Union Producing Co. has one well producing; one still drilling to test deep possibilities, but which will almost certainly make a well somewhere around regular depths; and one well drilling which will be a 1½-mile southwest stepout if it makes oil. These three wells are respectively in SE NW 25-10n-21w, NE SW 24-10n-21w, and SE NW 35-10n-21w.

Despite all these wells, no one is sure of anything much about the field. This is because the pay zone is a very thick granite wash section, in which gas, gas and condensate, and oil have been found in various parts of the wash in individual wells. From well to well, the pays seem to vary through about 1,000 ft. of wash. Correlation is difficult, if not impossible.

Ignoring the inability to call geological markers or identifying characteristics (at least by conventional methods); but assuming that the pays are probably the same horizon at different places on the structure, interpretation is possible. It looks like a long northwest-southeast structure, with most of the wells pretty close to the axis, the Union well in Section 35 being the question mark about how far down dip the production will go. This checks the geophysical picture, it is reported, and seems reasonable on a basis of what one would expect from the regional geology.

But, insofar as hard and fast correlations are concerned, the situation has improved very little in the past 3 months. *(See The Oil and Gas Journal, November 11, 1948, page 405).* It is still a proposition of careful feeling the way down; of coring, of drill-stem testing. Nobody is particularly anxious to get a gas-condensate well at 10,000-ft. depths; everybody wants an oil well. So, it is feel your way, core, drill-stem test, and hope to find the oil pay, and be able to case off the gas and condensate.

Some geologists are speculating about the possibilities of developing a new technique for correlations in granite wash sections. Geophysicists say it should be possible. Instruments and techniques are available for determining from cuttings, whether a well is drilling in wash or solid granite. *(See The Oil and Gas Journal, September 2, 1948, page 84).*

In the course of developing these techniques, some tests were run on correlating marker horizons in wash, in an area where normal geologic methods had already established markers. It is reported the correlation by magnetic measurements were good; but no commercial demand existed for the method at that time. In fact, correlations by magnetic measurements have been reported feasible in clays and shales. (See article by H. Wayne Hoylman and H. A. Durbin, Transactions American Geophysical Union, 1944, Part IV, page 543).

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—J. G. Dyer of Denver found an estimated 4,000,000 cu. ft. of gas daily in the Hygiene between 1,300-1,411 ft. at Loveland, Colorado, wildcat, and is drilling ahead for a test of the Muddy, Dakota and Morrison sands. Phillips Petroleum Co. et al cored additional Phosphoria saturation in the first Golden Eagle, Wyoming, deep test, and is drilling ahead for Tensleep. No test has been made in the Tensleep of Atlantic Refining Co.'s Riverton, Wyoming, wildcat, but additional saturation has been cored in the formation.

ALABAMA.—The deepest test ever drilled in the state, Humble Oil & Refining Co. 2 Jessie R. Williams, Washington County, has been completed as a dry hole. Operators plugged the well after drilling to a depth of 15,659 ft.

NORTH TEXAS.—R. B. Thrift 1 W. O. Blocker, W. A. Gorman Survey, was showing for a 2-mile southwest extension to the West Chico field of Wise County. A 90-minute drill-stem test in the conglomerate at 6,491-6,505 ft. showed gas in 5 minutes and recovered some 5,000 ft. of clean oil. Oil unloaded from the pipe as it was pulled. There are no dry holes between the 1 Blocker and the field proper.

WEST TEXAS.—Union Oil Co. 1 Jack Frost recovered Ellenburger oil on a drill-stem test, giving northeastern Coke County prospects of a new discovery. Tex Harvey 1 Floyd, Midland County discovery, was opened after being shut in most of the time for the past five weeks, and flowed an estimated 110-140 bbl. of oil a day. Pump was being installed for completion.

CANADA.—A new Madison lime pool for Alberta seemed assured when Stanolind-Imperial-Barrhead 1 tested 43.8 bbl. of oil per hour after acidizing.

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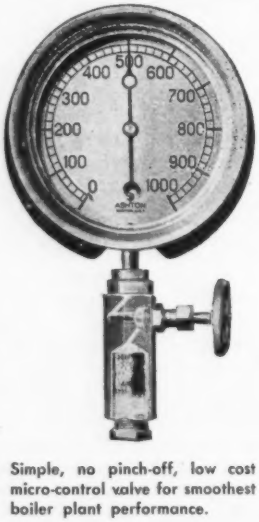

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N. CENTRAL TEXAS

Wise County Test Shows Oil and Gas

WICHITA FALLS.—Cities Service Oil Co. 1 Ella T. McKissick, Wise County wildcat 3 miles southwest of Decatur, reported a show of oil and gas in drilling an unidentified sand from 6,539-43 ft. Base of the sand was 6,550 ft. Operators drilled ahead below 6,581 ft., and apparently did not run a test of the above section.

Two miles southwest of the West Chico field, R. B. Thrift 1 C. A. Lawrence, J. B. Patterson Survey, tested nearly 1,500,000 cu. ft. of gas from perforations at 5,396-5,404 ft., in the Bend conglomerate. The formation was acidized with 2,000 gal. Testing continued. Thrift 1 W. O. Blocker, W. A. Gorman Survey, 1 mile north of the 1 Lawrence, ran a 1-hr. drill-stem test from 5,402-16 ft., which showed gas at the surface in 6½ minutes, rated at 1,000,000 cu. ft. daily, and recovered 15 ft. of gas-cut drilling mud. It was to drill deeper.

Five miles northwest of Alvord, Oil Well Drilling Co. 1 J. J. Patton was drilling below 5,210 ft. Mid-Continent Petroleum Corp. 1 McBride, 2 miles south of Paradise, was drilling below 5,957 ft.

In Throckmorton County Fred M. Manning, Inc., 1 Brown-Condron Davis, on the line between Blocks 1627 and 1628, TE&L Survey, 8 miles south of Throckmorton, flowed 105 bbl. of oil in 24 hours to open a new pay zone for the Condron-Davis Caddo field from the Mississippian. Open hole was tested from top of the zone at 4,666 ft. to total depth at 4,679 ft.

In northern Jack County, Mid-Continent Petroleum Corp. 1 W. N. Killen was showing for a new Strawn sand discovery. A drill-stem test from 3,790-95 ft., open approximately 1 hour, had gas at the surface in 6 minutes and flowed an unestimated amount of oil during the last 10 minutes of the test. Further details and the recovery of oil from drill pipe were not available. Operators cored ahead to 3,810 ft., obtaining a full section but a report on it was pending laboratory examination. The wildcat is on a block of 1,300 acres, which was detailed with seismograph prior to drilling. The well is to be completed in the Strawn, with deeper horizons scheduled to be tested at a later date, it was said.

Three miles north of Jacksboro, Jack Grace Production Co. 1 L. L. Campsey, J. M. Hudson Survey, was drilling below 5,320 ft. in shale.

In southeastern Archer County, Noranda Oil Co. 1 H. O. Prideaux, Block 16, J. Dorsey Survey, had new Strawn sand production. On pumping tests it gaged 17.7 bbl. of 40°-gravity oil in 3 hours and was given a calculated daily potential of 141.8 bbl. of oil a day. Pay was from 4,218-39 ft., total depth.

In Clay County, Howard M. Baron 1 J. O. Wyatt, Section 781, W&NW Survey, 1½ miles northwest of Carey, had started drilling toward its contract depth of 6,500 ft. Four miles west of Joy, L. T. Burns 1 S. L. Fulghman, T. J. Belcher Survey, was drilling below 3,595 ft. in shale. Burns 1 Stewart-Booth, Block 2623, TE&L Survey, 2 miles east of the Antelope field, was drilling below 3,600 ft. in shale and sand. Three miles southwest of Halsell, S. D. Johnson 1 Miller, Lot 6, Block 3, Clark & Plumb Survey, was progressing below 5,350 ft. in shale.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Archer County: L. H. Choate 1 A. Abercrombie, Wm. A. Hassell Sur., 2 mi. SE Archer City, flowed 57 bbl. 42°-gravity oil in 3 hr., ¼-in. choke, sand 3,715-25 ft., TD, GOR 1,200 cu. ft., CP 350 psi., TP 300 psi.

Clay County: Hassie Hunt 1 Lilyan Chilson, C. Thompson Sur., 2½ mi. NW Joy, pumped 62 bbl. 42°-gravity oil a day, sand 4,560-75 ft., GOR 400 cu. ft., TD 4,617 ft.

Wichita County: Perkins & Cullum 1-B Chilson, Blk. 21, League 4, Denton CSL, 2 mi. SE Kempner field, flowed 64.3 bbl. oil in 4 hr., open 2-in. tubing, TP 60 psi., sand 4,017-40 ft., TD, GOR 200 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Bridwell Oil Co. 3 P. Campbell, Sec. 1379, TE&L Sur., 4 mi. SW Anarene, dry, TD 1,024 ft.

W. G. Gouchie 1 E. Shreiber, Lot 34, Blk. 5, Clark & Plumb Subd., 4 mi. E Archer City, dry, TD 1,126 ft.

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Levins Sur., 6 mi. SE Archer City, dry, TD 1,060 ft.

Reno Oil Co. 1 L. F. Wilson, Blk. 75, Lot 1, ATNCL Sur., 6 mi. N Archer City, dry, TD 3,984 ft.

Brown County: G. C. English 1 B. C. Cox, A. J. Beaver Sur., 13 mi. SW Brownwood, dry, TD 1,998 ft.

Port Fuel Co. 1 Charles Nichols, Sec. 49, HT&B Sur., 1 mi. SW Byrds, dry, TD 2,505 ft., Caddo 1,797 ft., Marble Falls 2,381 ft.

Callahan County: Star Oil Co. 1 O. W. Lowe, Sec. 522, James O. Young Sur., 4 mi. S Clyde, dry, TD 2,027 ft.

B. F. Phillips, Jr., 1 A. A. Purcell, J. Levins Sur., ½ mi. NE Rock Crusher, dry, TD 4,064 ft., Ellenburger 3,940 ft., elev. 1,934 ft.

Clay County: Standard Oil Co. of Kansas 1 E. F. McEntire, Clayton Rogers Sur., 1 mi. NW Frisco, dry, TD 6,856 ft.

Cooke County: Burk Royalty Co. 1 J. F. Parks, Henry Baker Sur., 3 mi. NE Woodbine, dry, TD 2,890 ft.

Shuggs & Neal 1 G. A. LeMaster, Blk. 2, League 7, University Lands, 10 mi. NE Gainesville, dry, TD 5,574 ft.

Eastland County: T. W. & J. M. Loffland and Signal Oil & Gas Co. 1 Connelee, Nance Sur., 1½ mi. S Eastland, dry, TD 3,857 ft., Caddo 3,050 ft., Barnett 3,563 ft., Ellenburger 3,631 ft., elev. 1,464 ft.

Haskell County: Pan American Production Co. 1 R. H. Austin, Sec. 20, Blk. 2, H&TC Sur., 4 mi. SE Sagerton, dry, TD 5,102 ft., Dotham 2,050 ft., Saddle Creek 2,385 ft., Coal 2,436 ft., Flippen 2,453 ft., Hope 2,610 ft., Gunsight 2,824 ft., Swastika 2,918 ft., elev. 1,606 ft.

Jones County: W. P. Carr 2 D. E. Prewit, Sec. 22, D&DA Sur., 7 mi. SE Stamford, dry, TD 3,540 ft.

Ungren & Frazier 1 J. C. Culberson, Sec. 6, GH&H Sur., 5 mi. NE Hamlin, dry, TD 3,341 ft., Noodle Creek 2,445 ft., Saddle Creek 2,745 ft., King sand 3,110 ft., recovered 50 ft. of oil on DST 3,257-65 ft.

Palo Pinto County: Signal Oil Co. and T. W. & J. M. Loffland 1 L. B. Carpenter, S. H. Evans Sur., 7 mi. E Santo, dry, TD 4,965 ft., Ellenburger 4,716 ft., elev. 846 ft.

Stephens County: Star Oil Co. 1 Marion Graham, Sec. 81, Blk. 4, T&P Sur., 7 mi. E Frankell, dry, TD 2,807 ft., lime 1,840 ft., sand 1,847 ft.

Wichita County: Timberlake & Scott 1 R. B. Parker, Blk. 32, Cowherd Bros. Subd., SPRR Sur., A-264, 5 mi. SE Iowa Park, dry, TD 4,406 ft.

OKLAHOMA

Confirmation Well for Union Point Pool

NEAR the end of last year, Earl Sadler completed 1 Gaddy, NW NW SE 21-10n-2e, to open Union Point pool in Pottawatomie County. Last week, Norman Smith, Fred Morgan, and Earl Sadler found oil at the north offset to the discovery well. The new well, 1 Neighbors, SW SW NE 21-10n-2e, topped the Wilcox at 5,941 ft., and on a drill-stem test at 5,961-72 ft. the well had gas in 5 minutes and oil in 42 minutes. The estimated rate of fillup was about 100 bbl. per hour. The well flowed three times while tool was being pulled. Bottomhole pressure was 2,100 psi. The discovery well was completed for 270 bbl. per day.

The southwest side of Southeast Newcastle pool again attracted interest as Ashland Oil & Refining Co. cleaned out for an oil well in what was originally considered a noncommercial well. The well, 1 Dean, NE SE SE 31-9n-3w, McClain County, two locations south and one location west of the discovery well, was given two acid treatments and flowed 127 bbl. in 24 hours through a 12/64-in. choke. Production was through perforations at 8,822-8,930 ft., opposite the Hunton. Mid-Continent Petroleum Corp. has extended the pool on the north side with the completion of 1 Hardie, C SE NE 30-9n-3w, for 135 bbl. per day.

The upper part of North March pool in Payne County has a prospective west extension at Deep Rock Oil Corp. 1 South Eddie, SE SE SE 1-18n-4e. The hole was carried to 2,973 ft. and was reported to be filling at the rate of 100 ft. per hour. The pay will be shot. The same operator is rigging up at the north offset and clearing location for a south offset.

The recently opened Happy Valley pool in Lincoln County has a good confirmation well at Blackwell Oil & Gas Co. 1 Haskin, SW SW NE 25-17n-5e, a northwest diagonal offset to the discovery well. The Haskin well set casing on the Bartlesville at 3,406 ft. and flowed at the rate of 40 bbl. per hour.

Continental Oil Co. has started a confirmation test in the recently opened Northwest Hewett pool in Carter County. The well, Continental 1 Dunbar, SW SW SW 5-4s-2w, is an east offset to the discovery well.

OKLAHOMA SUCCESSFUL WILDCATS

Garvin County: Davon 1 Layton, SE SW SE 36-3n-3w, flowed 115 bbl. of 53°-gravity distillate per day through ½-in. tubing choke from Hartshorne sand at 3,308-32 ft., TD 7,430 gt.

Hughes County: Murta 1 Davis, SW SW NW 20-8n-9e, flowed 12 bbl. of distillate per day through 28/64-in. tubing choke from Cromwell at 3,321-36 ft., TD.

McClain County: Extension to Southeast Newcastle—Mid-Continent 1 Hardie, C SE NE 30-9n-3w, flowed 135 bbl. oil per day through 12/64-in. tubing choke from Hunton at 8,790-8,836 ft., TD 8,839 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: Locke 1 King, NE NW SE 29-3s-9w, dry, TD 1,804 ft., sand 1,470-95 ft., 1,530-50 ft. and 1,795-1,804 ft.

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Garvin County: Pace 1 Lee, NW SE NW 35-3n-2w, dry, TD 7,020 ft., base Checkerboard and top Deese 5,548 ft., first Deese 5,616 ft., first Deese sand 5,640-52 ft., second Deese 5,683-5,751 ft., Deese sand 5,783-5,810 ft., basal Pennsylvanian-Hunton 5,895 ft., Sylvan 6,033 ft., Viola 6,208 ft., bromide dense 6,695 ft., first bromide sand 6,940 ft.

Harper County: Cities Service 1 State "D," NW NW NW 20-26n-21w, dry, TD 6,931 ft., Herrington 2,620 ft., Howard 3,845 ft., first Tonkawa lime 4,490 ft., first Tonkawa sand 4,520-4,610 ft., third Tonkawa lime 4,790 ft., Layton 5,150 ft., Checkerboard 5,505 ft., basal lime-Oswego 5,590 ft., Cherokee 6,055 ft., Chester 6,380 ft., sandy lime 6,713-40 ft.

Major County: Gulf 1 Turner Unit, C SW SE 2-21n-9w, dry, TD 8,096 ft., Oswego 6,232 ft., Prue 6,573 ft., Dornick Hills 6,723 ft., Mississippi lime 6,973 ft., Kinderhook 7,501 ft., Woodford 7,513 ft., Hunton 7,609 ft., Sylvan 7,620 ft., Viola 7,E23 ft., Wilcox 7,913 ft., second Wilcox 7,996 ft.

Seminole County: Ligon 1 Davis, SW NE SE 10-8n-8e, TD 3,448 ft., lime 2,835 ft., Booch 2,970-95 ft., Gilcrease 3,175 ft., Union Valley-Cromwell 3,380 ft., second Cromwell 3,420 ft.

Stephens County: Davidor 1 Parker, SW NE NW 28-1s-8w, dry, TD 3,255 ft., no tops reported (gelogical wildcat).

APPALACHIAN FIELD

West Virginia Gets Three Good Gas Wells

PITTSBURGH. — Three good gas wells were reported in West Virginia, proing from the Maxon said. In Clear Fork district, Raleigh County, United Fuel Gas Co. No. 10-6435 Coal River Mining & Land Co. tested 2,114,000 cu. ft., total depth 2,763 ft.; in Baileysville district, Wyoming County, United Producing Co. No. 14-1515 Pardee Land Co. gaged 4,142,000 cu. ft., total depth 2,495 ft., and in Oceana district, this company's No. 17-1556 Pardee Land Co. gaged 5,206,000 cu. ft., total depth 2,289 ft. In Portland district, Preston County, William E. Snee No. 3 Sisler has been bailed and cleaned out to the original depth of 5,622 ft. A string of casing will be run and deeper drilling operations started from the Onondaga chert to the Oriskany said.

New locations reported were 10: Grant district, Hancock County; Jefferson and Laurel Hill districts, Lincoln County; Logan district, Logan County; Trap Hill district, Raleigh County; and Grant and Lincoln districts, Wayne County.

In Georges Township, Fayette County, Pennsylvania, Manufacturers Light & Heat Co. No. 8 Barton Estate, which reached a depth of 10,312 ft. and encountered a fishing job, is drilling by the tools at 10,265 ft. In Elder Township, Cambria County, Peoples Natural Gas Co. No. 3831 Clearfield Bituminous Coal Co., wildcat, is drilling at 4,029 ft.

New locations reported were eight: Madison, Parks, Valley and Kittanning townships, Armstrong County; Armstrong and Conemaugh townships, Indiana County; and Clover Township, Jefferson County.

SOUTHWEST TEXAS

Pool Opener in Frio County Yields 8 Bbl. a Day

CORPUS CHRISTI.—Shell Oil Co., Inc., A-1 Bain, new pool opener 4 miles south of Bigfoot and 14 miles northeast of Pearsall, in Frio County, is being rated at 8 bbl. per day on the pump. Drilled to a total depth of 3,280 ft., the 7-in. casing was set to 3,211 ft. for open-hole completion. The 2-in. tubing was run to 3,251 ft. Silty sand with glauconite was cored at 3,215-23 ft., with oil show, also at 3,227-34 ft., 3,241-45 ft., and 3,254-80 ft. with shale breaks between. This well is in John Bruggeman Survey 133, A-63.

Miller Royalty Co. and Milam Drilling Co. 1 C. R. Thompson, has indicated a possible 1⅔-mile southeast extension to the new field, in the Bigfoot area of Frio County. Sand with oil odor was cored from 3,293-96 ft. Sand with gas odor has been cored from 3,283-89 ft., and 3,289-93 ft.

Shell 1 Bevly, wildcat test in Nueces County, approximately 3 miles south of Clarkwood, recovered 360 ft. of condensate and 340 ft. of condensate-cut mud, on a drill-stem test at 9,929-46 ft., using ¼-in. chokes, with 3,000-ft. water cushion. Well flowed in 3 minutes on the test and developed a maximum working pressure of 1,400 psi. This well is located in the Wm. J. Cody Survey. Operators now are waiting on casing which they will set in this test.

There were 31 new locations reported for Districts 1 and 4, with 13 being wildcat starts, 1 each in Bastrop, Bexar, Brooks, Duval, Gillespie, Kenedy, Kleberg, La Salle, San Patricio, Starr, Webb, Zapata and Zavala counties. One successful wildcat was completed in Starr County while 9 were dry, 2 in Jim Hogg, and 1 each in Bastrop, Caldwell, Duval, Gillespie, Webb, Williamson, and Zapata counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4)
SUCCESSFUL WILDCAT

Starr County: New oil pool—D. G. Wood, Sr., 1 fee, Porcion 84, 4 mi. NE of Rio Grande City, top pay 1,315 ft., TD 1,321 ft., open hole 1,315-21 ft., IP 23 bbl. net oil per day on pump, no gas, gravity 22°.

SOUTHWEST TEXAS (DISTRICTS 1 & 4)
WILDCAT FAILURES

Bastrop County: J. F. Barron 1 Homer A. Ferguson, A. G. Moore Sur., 3 mi. N of Lytton Springs, dry, TD 1,914 ft.

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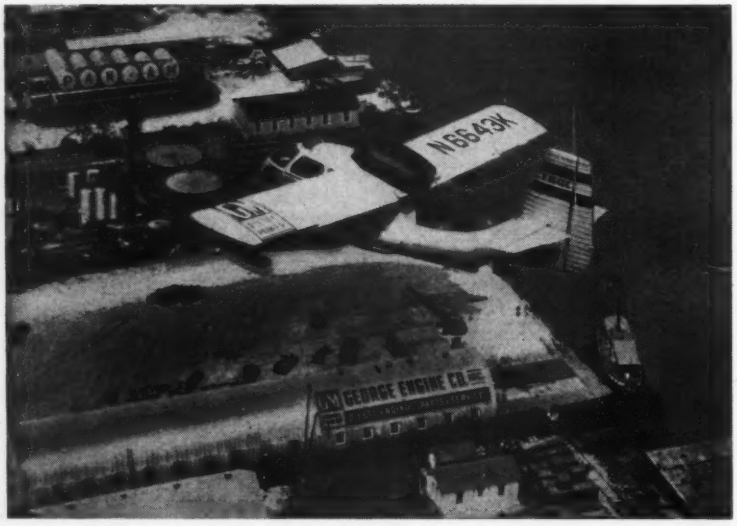

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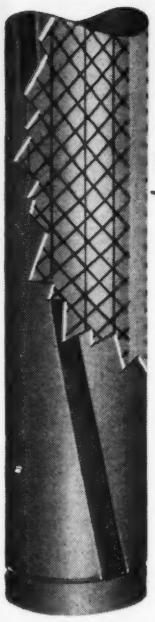

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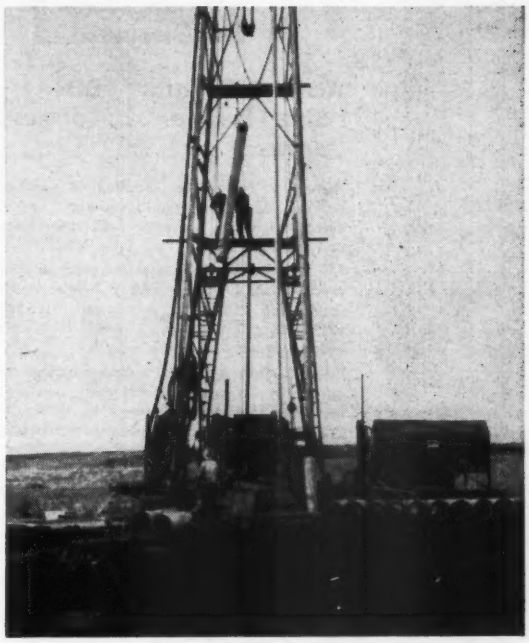

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Duval County: The Atlantic Refg. Co. A-3 Hagist Ranch, Inc., BS&F Sur. 267, 10 mi. NE of Freer, dry, TD 2,297 ft.

Gillespie County: R. I. Raborn, Jr., 1 Joe & Pearl Burkett, in Block 22, Morris Ranch land subd., Sec. 71, A-413, 2 mi. N of Morris Ranch townsite, dry, TD 780 ft.

Jim Hogg County: Rodney De Lange and Holly Dev. Co. 1 Lorina Jones Spoonts Lewis, in Block 20, San Juan Pasture, Agua Nueva de Arriba Grant, 22 mi. SE of Hebbronville, dry, TD 5,507 ft.

S. F. Hurlbut 2 Julian Vela Pena et al, Block 33, M. W. White subdn., Share 3, El Peyote Grant, 20 mi. SW of Hebbronville, in 'Patel" area, dry, TD 1,570 ft.

Webb County: Blanco Oil Co. and Al Buchanan 1 Federico Lopez et al, Sur. 55, 12 mi. NE of Bruni, dry, TD 4,331 ft.

Williamson County: Puma O. & G. Co., Inc., 1 Jeff Dobias, in Pedro Zarza Sur., 4½ mi. SW of Granger, dry, TD 1,025 ft.

Zapata County: Bridwell Oil & W. C. McBride, Inc., A-7 Robert Hinnant, Sur. 110, 22 mi. SE of Mirando City, 2 mi. NW of Cuellar field, dry, TD 1,511 ft.

CANADIAN FIELDS

Stanolind and Imperial Open New Barrhead Pool

CALGARY.—Another oil discovery was chalked up in Alberta this week, with commercial production assured at the Stanolind-Imperial-Barrhead 1, about 55 miles northwest of Edmonton. Stanolind Oil & Gas Co. discovered oil in the Madison limestone at Barrhead, its first Alberta wildcat, on a 168,000-acre Crown reservation. Site of the new discovery is in LSD 15, 10-58-5w5.

The Barrhead venture topped the pay zone early in December at 3,980 ft., found some porosity, and ran drill-stem test from 3,992-4,018 ft., the result of which was a gas flow of 150,000 cu. ft. daily, plus a pipe recovery of 375 ft. of oil-cut mud in 45 minutes. More porosity showed below, with no evidence of water. With a good oil prospect indicated, the well then continued on for Devonian tests, and completed recently at a total depth of 6,414 ft. without finding oil or gas in the levels below the Madison.

The hole was plugged back to 4,117 ft. and 7-in. casing was set at 3,992 ft. Later the lime formation was washed with 240 gal. of acid, followed by a 500-gal. acid treatment. The well was then swabbed, and kicked off after 11 swabs had been run. It was allowed to flow for a short time with an estimated recovery of 15 bbl. hourly, but actual measurement of gas and oil flow were not taken.

On the latest flow test, the new discovery made 24.4°-gravity oil at an average rate of 43.8 bbl. an hour during a 5½-hour run. The well made 241 bbl. during the period, or at a daily rate of 1,052 bbl., and was then shut in pending completion of tankage set-up. Additional tanks are currently being installed prior to running a 24-hour test to determine further potentialities of the discovery.

Redwater.—Anglo-Home Redwater 5, LSD 8, 36-57-22w4, kicked off and started on production with probably the largest pre-acid flow to date in the Redwater field. On an 18-hour open flow run, the well produced 730 bbl., an average of 40.6 bbl. hourly, equivalent to a daily potential of 974 bbl. Before being placed on steady production it will receive a 6,000-gal. acid treatment which will likely increase its potential substantially.

Leduc.—Home Leduc 18, D-2 Devonian zone completion at 5,180 ft., in LSD 1, 3-50-26w4, was swabbed into production and flowed oil at approximately 20 bbl. hourly, or 480 bbl. per day.

Leduc Calmar 1, LSD 5, 25-49-26w4, southeast Leduc extension test, is running a drill-stem test of the interval 5,200-18 ft. The 9-ft. core to bottom 5,218 ft. showed 6 ft. of good porosity with stringers of anhydrite present. Top of the D-2 zone porosity is believed to be at 5,210 ft.

Pipestone Creek.—Sun Oil Co. is starting its first well on the central Alberta plains, under an agreement reached with Imperial Oil, Ltd. The well, Sun-Pipestone Creek-Province 1, is about 5 miles northwest of Wetaskiwin, and about 20 miles southeast of the Leduc oil field, in LSD 5, 11-47-24w4. The new venture is planned as a test of all horizons down to and including the D-3 Devonian equivalent, with completion depth slated at around 5,900 ft. It is on a seismograph feature, with Imperial Oil holding about 7,000 acres and Sun about 2,000 acres. Under the agreement between the two companies, the 9,000 acres become joint property.

Priddis.—Royalite Oil Co.'s Priddis 1, wildcat about 15 miles southwest of Calgary in LSD 13, 30-22-3w5, has finally reached its Madison limestone objective at a depth of 10,085 ft. First porosity showed around 10,111 ft. and currently some 28 ft. of slightly porous section has been cored. The hole is now bottomed at 10,164 ft. As yet no drill-stem test has been run in the Madison.

Oliver Lake.—Leduc Calmar Oils will drill a wildcat on a seismograph picture east of the Superior-Joseph Lake's Viking sand oil discovery. Leduc Calmar-Oliver Lake 1 will be drilled in LSD 10, 15-50-21-w4, about 1 mile south and 5 miles east of the recent Joseph Lake strike. Calmar's acreage is a 9,000-acre block farm-out from Imperial Oil, Ltd. Drilling is slated to commence immediately.

Sylvan Glen.—The Clancy-Imperial-Sylvan Glen test has obtained encouraging shows of oil and gas from 2,790-2,818 ft. The well is located about 55 miles north of Edmonton in LSD 1, 18-64-26w4. The zone is either basal Cretaceous or upper levels of

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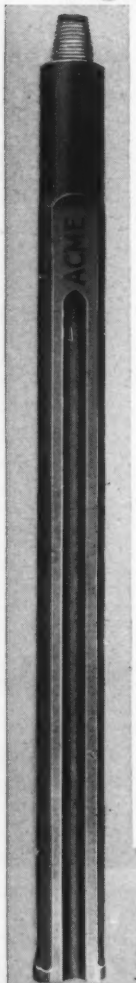

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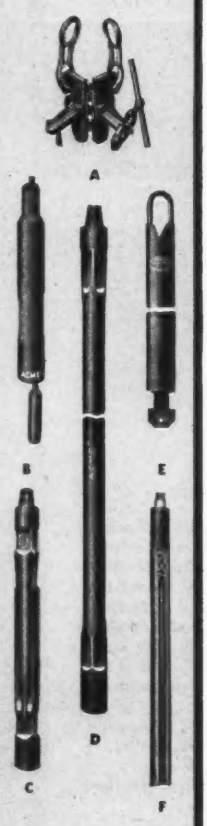

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B—Prosser Swivel Socket
C—Drilling Jar
D—Drilling Stem
E—Bailer
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CRALL SPIRAL PARAFFIN SCRAPERS

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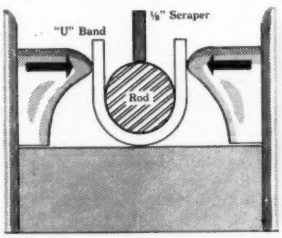
ELIMINATE PARAFFIN ACCUMULATION

The New More Economical Way

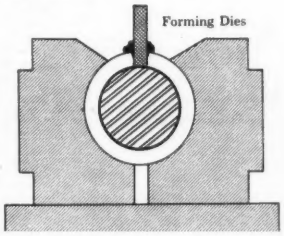
. . . in the tubing of PUMPING WELLS

This illustration shows how scrapers securely attach to rod. Rod string does not rotate. Scrapers also act as rod guide.

CRALL Spiral Paraffin Scrapers fit any sucker rod. When scrapers are placed on the reciprocating rod at specified distances, they meet or pass each other with each reciprocation. The complete coverage and churning action in the tubing column of oil prevents the accumulation of paraffin. CRALL Scrapers are now used by scores of major and independent oil-producing companies.



Cross section showing "U" band being die-formed around rod to within a fraction of an inch of scraper blades.



Cross section showing band held under pressure around rod while ends of band are shrink-grip attached to scraper blade.

The "U" bands are placed on the rod in a special die jig and formed the remaining distance around the sucker rod to within a fraction of an inch of the scraper blade. The sucker rod with scraper in place, is then passed on to the special air pressure die jig and the bands are held under pressure around the rod while the ends are being shrink-grip-attached to the scraper blade. This effects an extra strong 360-degree FRICTION grip on the scraper to the rod without impairing in any way, the properties of the material in the sucker rod. NEITHER SCRAPERS NOR BANDS ARE WELDED TO THE SUCKER ROD.

The original installation is the ONLY cost. Order your CRALL Spiral Scrapered Rods from your Supply Store or phone, wire or write . . .

Look at these Features:

1. Saves work-over, passing scrapers and eliminates STRIPPING JOBS.
2. Scrapers average six ounces each, making extra load to string negligible.
3. Scrapers alternate—one right, the next left, eliminating tendency of the rod to unscrew . . . a balanced rod string.
4. No work at well. Give us size tubing, number of scrapers per rod or length stroke of pump.
5. No gadgets to fool with. No maintenance costs. Pay for themselves in saving down time.
6. Tests in actual operation show CRALL Scrapers still performing perfectly after months and months in use.

CONSTRUCTION:

CRALL Spiral Scrapers are made of ⅛" thick mild steel, approximately 6" long. The width of the scraper blade varies to give you 1¾" O. D. coverage in 2" tubing, and 2¼" O. D. coverage in 2½" tubing, regardless of size of sucker rod used. Perfect fit is guaranteed, and there is no stress on the metal. The ⅛" x 1" preformed "U" bands to hold the scraper rigidly in place (one at each end of scraper) are made of mild strap steel. This scraper will not slip on the Sucker Rod.

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Devonian. Unofficial but reliable information indicates that a series of three drill-stem tests has given small flows of natural gas with pipe recoveries ranging from 120-180 ft. of gassy crude oil. No water has shown. Operations are continuing below 2,818 ft.

SOUTH LOUISIANA

New Gas Pay Opened In Terrebonne Parish

NEW ORLEANS.—A new deep pay has been opened in the Pointe Au Fer Unit 1, in Section 35-20s-11e. Drilled to a total depth of 11,500 ft. with pay topped at 9,862 ft., the well was completed through perforations at 9,862-66 ft. flowing an initial production of 75 bbl. of 48.9°-gravity condensate along with a large gas volume per day. Flowing pressure on tubing while on a 5/32-in. choke was 3,100 psi., showing a gas-condensate ratio of 96,921. A string of 9⅝-in. casing was cemented to 11,000 ft.

In the South Bancroft area of Beauregard Parish, Roeser & Pendleton, Inc., 2 Columbia Land & Timber Co., 27-6s-13w, is now cleaning through perforations at 10,227-10,235 ft., making oil and wash water. Well was drilled to a total depth of 10,478 ft., and 5½-in. casing cemented to 10,477 ft. Operators are preparing to complete.

Humble Oil & Refining Co. is in the process of completing a second oil well in the Caminada Pass area, Jefferson Parish. The 1 Caminada Pass, State Lease 804-D, in Tract 1114, Block 16, is being completed through perforations from 6,128-38 ft., and through a 3/32-in. choke, the well is cleaning out with flowing pressure on the tubing at 375 psi. Total depth is 6,280 ft., and 7-in. casing is hung at 6,267 ft.

In the Big Point area of St. Tammany Parish, located on the northern portion of Lake Pontchartrain, Lynn Oil Co. and Temple Hargrove et al 1 State Lease 318, has been completed for a potential of 70 bbl. of condensate per day along with 3,479,000 cu. ft. of gas daily flowing through a ¼-in. choke. Gravity of the fluid was 56°, with gas-condensate ratio 49,700. Flowing pressure on tubing was 2,840 psi. Total depth is 7,472 ft., with production through perforations at 7,210-7,214 ft.

The 37 new locations reported for South Louisiana included 13 wildcat starts, 3 in St. Martin, 2 each in Beauregard, Cameron, and 1 each in Acadia, Evangeline, St. John the Baptist, St. Landry, St. Mary, and Vermilion parishes. One successful exploratory test was completed in Terrebonne Parish while two were dry, 1 each in Lafourche and St. Charles parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Terrebonne Parish: New gas-condensate pay, Pointe Au Fer—Texas Co. 1 Point Au Fer Unit 1, 35-20s-11e, TD 11,500 ft., top sand 9,862 ft., perf. 9,862-66 ft., IP: 75 bbl. condensate per day through 5/32-in. choke, GOR 96,921, TP 3,100 psi., 48.9° gravity.

SOUTH LOUISIANA WILDCAT FAILURES

Lafourche Parish: The Texas Co. 1 State Lease 919-Leeville, in Hackberry Bay, Twp. 21s-22e, off W flank of Leeville dome, dry, TD 15,003 ft.

St. Charles Parish: Johnson & Gill-British American Oil Prodn. Co. 1 La.-Ark. RR, 39-12s-9e, NW of Kenner, La., and approx. 5 mi. NE of Good Hope production, dry, TD 10,573 ft.

TEXAS GULF COAST

New Gas Pool Opened In Galveston County

HOUSTON.—A new gas-condensate pool in the Hannah Reef area of Galveston Bay, Galveston County, has been opened by Sun Oil Co. 1 State-Hannah Reef, located on State Lease 232, 8 miles north of Port Bolivar, and 7 miles southeast of Red Fish Reef production. The well was washed and kicked off flowing at the rate of 135 bbl. of 50.2°-gravity condensate per day, through a 10/64-in. choke with flowing pressure on the tubing at 3,200 psi., casing pressure 450 psi. Gas-oil ratio 13,510. Production is through perforations from 10,674-10,688 ft. Operators now are preparing to make a potential flow gage.

Sun Oil is opening new oil production approximately 1½ miles south of the Oyster Bayou field in Chambers County. Their 30 Felix Jackson is located in the T&NO Survey, Section 125, 6,786 ft. south of nearest production at Oyster Bayou. Total depth is 10,250 ft., with 7-in. casing cemented to 9,150 ft., and 5-in. liner from this point to 9,800 ft. The test now is flowing through perforations at 9,543-46 ft., making about 80 per cent wash water, and 20 per cent oil while cleaning out using 12/64-in. choke. Pressure is varying from 500 to 800 psi. The sand being tested is presumably in the Lower Frio. Oyster Bayou production is obtained from the Frio sands at 8,230 ft. Frio is topped in the field at 8,137 ft.

Potential gage has been reported for The Texas Co. 1 Newton County Lumber Co., discovery well for Old Salem field, Newton County. Well is located in Jonathan D. Ray Survey, 10½ miles southeast of Call production. Drilled to a total depth of 12,610 ft., the well was completed through perforations in the Wilcox from 9,644-9,660 ft. On a 12/64-in. choke, the well flowed 43.5 bbl. of 44.2°-gravity oil per day with flowing pressure on tubing ranging from 60 to 520 psi. Gas-oil ratio 2,735.

McCarthy Oil & Gas Corp. 1 E. W. Boyt, H&TC Survey, has opened new gas production in the Vicksburg sands on northwest flank of the Hankamer field, Liberty County. Total depth is 8,058 ft., with 5½-in. casing cemented on bottom. Perfora-

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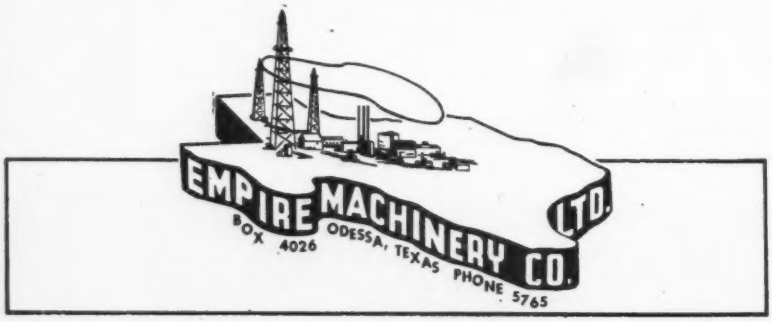

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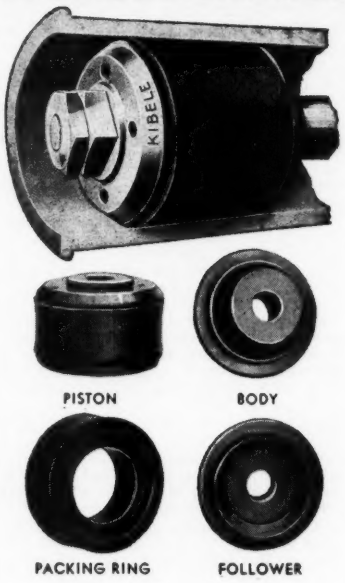

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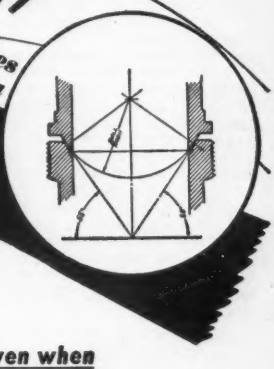

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MORGAN STANLEY & CO.

February 7, 1949.

tions were made from 8,007-8,021 ft., and a string of 2⅜-in. tubing and packer hung at 7,985 ft. The test flowed gas and was shut in, no gage taken.

Production has been confirmed and a new pay opened in East Hillister field, Tyler County, by Humble Oil & Refining Co. 2 William M. Rice Institute, Arthur Hutchins Survey, Abstract 846. On an initial test, through perforations at 7,346-7,350 ft., the well flowed 50.82 bbl. of 53.8°-gravity condensate daily through a 3/16-in. choke, with flowing pressure on tubing at 1,275 psi. Gas-condensate ratio 6,709. Total depth is 9,538 ft.

There were 34 new locations shown for Districts 2 and 3 with 9 being wildcat starts, 1 each in Bee, Calhoun, Goliad, Jackson, Karnes, Lavaca, Orange, Victoria, and Walker counties. Two wildcats were successful with one oil pool each for Montgomery and Newton counties. Five wildcat failures were reported, 1 each in Bee, Calhoun, Montgomery, Victoria and Wharton counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Montgomery County: New oil pool, West Conroe—Housh & Thompson 1 Edmund B. Clary, Est., 3 mi. W of town of Conroe and NW of Conroe field, TD 4,739 ft., top sand 4,616 ft., perf. 4,616-21 ft., IP 49 bbl. oil per day through ½-in. choke, GOR 1,670, TP 20 to 150 psi., CP 500 psi. (Note: Originally completed in 1938 through perforations 4,733-39 ft. as gas well).

Newton County: New oil pool, Old Salem—The Texas Co. 1 Newton County Lumber Co., NCT-1, in Jonathan D. Ray Survey, 10.5 mi. SE of Call townsite, 6 mi. E of Call production, TD 12,610 ft., top sand 6,644 ft., perf. 9,644-60 ft., IP: 44 bbl. oil per day through 12/64-in. choke, GOR 2,735, TP 60 to 620 psi., gravity 44.2°.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

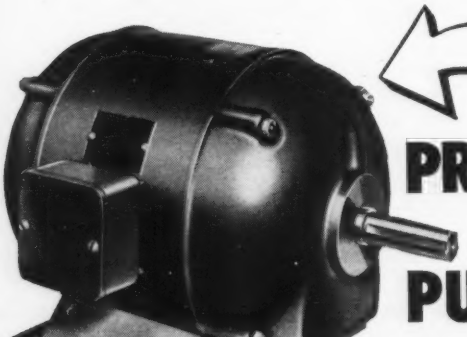
Bee County: P. R. Rutherford 1 Claude E. Heard, James Brown Sur., 10 mi. SE of Beeville, dry, TD 5,010 ft.

Calhoun County: The Texas Co. 1-B T. M. Florey, in Sam Houston League, 3.7 mi. N-NE of Olivia, dry, TD 8,040 ft.

Montgomery County: Production Service Oil Corp. 1 Charlie Snoe, in Wm. Weir Sur., 4 mi. NW of Willis, dry, TD 7,526 ft.

Victoria County: Balridge & King, Inc., 2 May Ward Williams, in S. Serna Sur., A-106, 3 mi. W of McFaddin, dry, TD 5,706 ft.

Wharton County: R. A. Welch & Federal Royalty Co. 1 Geitsman et al, in Wm. Robinson Sur., A-55, 5 mi. SE of New Taiton, dry, TD 6,880 ft.



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KANSAS

Rooks County Pool Gets Good Extension

BERLAND pool in Rooks County has a good extension to the north at Birmingham & Bartlett 1 Marcotte, SE SW NW 18-10s-19w. The well was drilled to a total depth of 3,770 ft., topping the Arbuckle at 3,756 ft. Casing was set to 3,766 ft. and well completed with an indicated capacity of 2,161 bbl. Another pay zone was indicated in the Lansing-Kansas City by a drill-stem test at 3,493-3,528 ft. where the recovery was 3,383 ft. of oil after tester had been open for 10 minutes. Berland pool was opened last May by The Texas Co., 1 Berland, NE SE SW 19-10s-19w, and by the end of the year, 7 oil wells had been added to the pool. Texas recently completed 11 Berland, SW NW NW 19-10s-19w, with a depthograph potential of 2,494 bbl., the best well to date. Texas has started 12 Berland, one location northeast of 11 Berland while Birmingham & Bartlett 1 Sutor, NE SE NE 24-10s-20w, is a southwest offset.

In the area about 1 mile south of Gates pool in Stafford County, W. P. Faulkner et al 1 Gates, NW NW NW 3-22s-13w, is making an Arbuckle well with production potential estimated at about 125 bbl. per day. The Arbuckle was topped at 3,748 ft. and total depth is 3,756 ft.

The prospective pool opener, Aladdin Petroleum Corp. and Hannum Drilling Co. 1 Brodie, SW SW SE 23-19s-12w, Barton County, pumped 12 bbl. per hour after treatment with 2,000 gal. of acid. Production is from the Arbuckle, topped at 3,344 ft. The well also had shows in the Lansing-Kansas City.

In the area about 2 miles east of Burrton pool in Harvey County, Westgate & Greenland Oil Co. has completed 1 Howard, SE SW NW 15-23s-3w, with a gas potential of 13,000,000 cu. ft. per day. Production is from the Mississippi, topped at 3,252 ft. Total depth is 3,386 ft.

For the week, a total of 57 new locations were announced including 14 in Barton County. Rooks County accounted for eight, Russell for seven, and Butler for five.

KANSAS SUCCESSFUL WILDCAT

Harvey County: Westgate-Greenland Oil Co. 1 Howard, SE SW NW 15-23s-3w, IP 29,900,000 cu. ft. of gas per day from Mississippi at 3,280-84 ft. and 3,315-3,326 ft., TD 3,381 ft.

KANSAS WILDCAT FAILURES

Barton County: Derby Oil & Peel 1 Beran, SE SE SE 13-17s-12w, dry, TD 3,360 ft., lime 3,030 ft., Lansing 3,046 ft., Arbuckle 3,339 ft.

Lindas & Armer 1 Behrens, SE SE NW 20-19s-15w, dry, TD 3,680 ft., anhydrite 940 ft., Heebner 3,218 ft., Lansing 3,308 ft., sandy conglomerate 3,585 ft., cherty conglomerate 3,589 ft., Gorham 3,620 ft., Arbuckle 3,630 ft.

Butler County: Franco Central Oil Co. et al 1 Harder, NE SE SE 21-24s-3e, dry, TD 2,890 ft., Kansas City 2,330 ft., Mississippian 2,786 ft.

Ellis County: Brunson Drilling Co. 1 Wei-

gel, NE NE SE 2-12s-19w, dry, TD 3,688 ft., anhydrite 1,435 ft., Heebner 3,328 ft., Toronto 3,348 ft., Lansing 3,367 ft., reworked Arbuckle 3,635 ft., Arbuckle 3,643 ft.

Osborne County: Sohio Petroleum Co. 1 Worley, NE SE NW 34-10s-15w, dry, TD 3,482 ft., Lansing 955 ft., Topeka 2,715 ft., Heebner 2,966 ft., Dodge 2,985 ft., Lansing 3,013 ft., basal Kansas City 3,274 ft., conglomerate 3,349 ft., Arbuckle 3,437 ft., Simpson 3,418 ft.

Sheridan County: Peel & Hardman Producers 1 Stuart, NE NE SE 1-6s-27w, dry, TD 4,140 ft., Heebner 3,565 ft., Lansing 3,612 ft., basal Kansas City 3,824 ft., conglomerate 4,037 ft., Arbuckle 4,098 ft.

CALIFORNIA

Standard to Deepen Well In Wasco Field to Eocene

LOS ANGELES.—A deep test to the Eocene will be drilled in Wasco field of Kern County by Standard Oil Co. of California, which has signified its intention of deepening its 5 Mushrush, Section 7-27s-24e, presently bottomed in the productive A-2 sand at about 13,100 ft. To reach its objective Standard will have to drill another 2,000 ft., possibly farther. The Eocene was explored in this field when Continental Oil Co., in its discovery well, drilled a short distance into the Eocene 11 years ago, establishing what at the time was a new world's depth record of 15,004 ft. Oligocene and upper Eocene shales, showing oil, were pentrated to a depth of 14,967 ft. in this well and below this depth Eocene hard fine sandstone, siltstone, and altered bentonite were cored to the bottom of the hole. Continental attempted to test these lower showings but reports at the time were to the effect that the tests failed because the temperature in the lower part of the well approximated 300° F. No commercially productive sand has been proved in Wasco field to date other than the A-2 sand which ranges in thickness from 25 to 40 ft.

Richfield Oil Corp. has extended production about ½ mile north in the White Rock area of Russell Ranch field in the Cuyama Valley, San Luis Obispo County. The company's 1 Sawyer, 25-11n-28w, has been completed flowing 1,143 bbl. a day of 34°-gravity oil through a ½-in. choke from 3,210 ft. This northerly extension appeared a foregone conclusion, however, when Hancock Oil Co., 2 weeks ago, extended production ¾ mile to the northwest with its 22-25 Wood-Callahan. Wildcatting in the Valley is being pressed by Richfield and others and this week this company, as well as Humble Oil & Refining Co., announced locations far to the southesat of present production. Richfield has made location for 1 Wegis on Section 9-9n-25w, about 15 miles southeast of Russell Ranch production. Humble will drill 3 miles south of this location on Section 28.

Three abandonments in the last week have made the outlook rather remote for further production around the recent town-lot discovery of R. W. Sherman, operator, at Newhall, Los Angeles County. One of the two wells being drilled by Sherman has been suspended and Standard of California, only major company in the area, has also suspended operations. The discovery well itself is having serious water trouble and at last report the cut was 90 per cent. Sherman recemented this well and is gun-perforating.

Showings have been logged that warrant running casing in the 1 Hollister-Fisher wildcat of Dan Fisher on Section 3-4n-29w, in the Goleta area of Santa Barbara County. Total depth is 1,428 ft. with top of the Eocene found about 1,321 ft. This well is only a few hundred feet from a discovery made here over 20 years ago by E. J. Miley which went to water. Whether its failure was due to water breaking in along a fault line or simply to a small oil accumulation has never been determined.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Belgian Anticline area: Pacific Western Oil Corp. 14-30 Midway-McKittrick-A, 20-20s-22e, flowed 4,000,000 cu. ft. of gas daily through 25/64-in. choke from interval 5,220-5,320 ft., 1,250 psi. tubing presure, 1,740 psi. casing pressure. Gas is somewhat wet, indicating presence of oil. Elev. 1,657 ft., TD 5,833 ft.

CALIFORNIA WILDCAT FAILURES

San Luis Obispo County, Carrizo Plains area: Howell and Thomas 1 Pam, 22-31s-21e, dry, elev. 2,815 ft., TD 85 ft.

Cholame area: Keloil, Inc., 1 Keller, 17-25s-16e, dry, elev. unknown, gas shows 1,820-50 ft., TD 2,025 ft. in schist.

Templeton area: Barnsdall Oil Co. 1 Harper, 1-27s-12e, dry, elev. 892 ft., Paso Robles 611 ft., Santa Margarita 1,195 ft., brown shale 1,986 ft., Vaqueros 3,739 ft., weathered granite 3,995 ft., hard granite 4,080 ft., TD 4,182 ft.

Kern County, Tejor area: Rainbow Oil Co. 3 Rainbow, 34-12n-18w, dry, elev. 1,035 ft., TD 1,340 ft. in granite.

Pattiway area: Whitehouse and Wilcox 1 McMurray, 17-10n-23w, dry, elev. 2,853 ft., TD 3,016 ft. in granite.

Fresno County, Northeast Coalinga area: Superior Oil Co. 33-27 Southern Pacific Land Co., 27-19s-16e, dry, elev. 423 ft. TD 11,274 ft.

Monterey County, San Ardo area: Superior Oil Co. 1 Etchenique, 28-21s-9e, dry, elev. 430 ft., TD 498 ft. in grante.

Ventura County, Fillmore area: Fairview Exploration Co. 3 Edwards, 27-4n-19w, dry, elev. 853 ft., TD 1,633 ft.

Point Magu area: Magu Oil Co. 1 Michler, 25-1n-22w, dry, elev. 15 ft., TD 1,552 ft.

Los Angeles County, Placerita Canyon area: Bevo Drilling Co. 4 Carter-Earl, 5-3n-16w, dry, elev. 1,506 ft., TD 1,248 ft.

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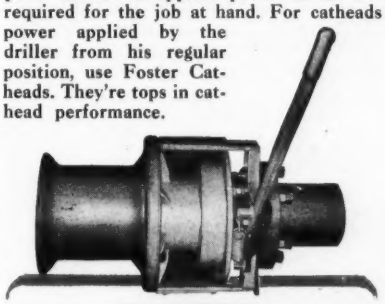

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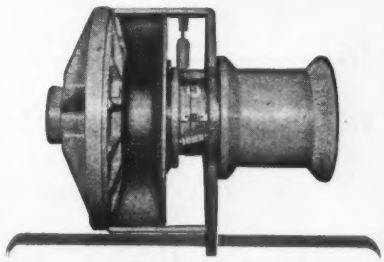

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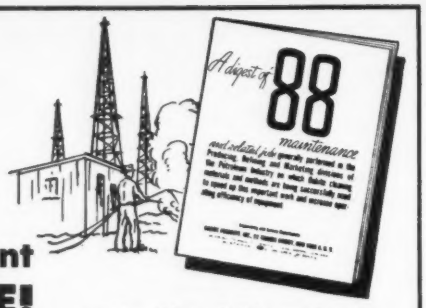

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ROCKY MOUNTAIN

Gasser Completed in Larimer County

DENVER.—J. G. Dyer et al recovered an estimated 4,000,000 cu. ft. of gas in its wildcat at 1 Trindle, CW½ NW SE 30-5n-68w, in the Loveland area, Larimer County, Colorado. The well topped Hygiene sand at 1,300 ft. and a core between 1,393-1,411 ft., total depth, showed slight staining in a sand of that formation. On drill-stem test between 1,330-1,411 ft. the well flowed dry gas, with volume estimated at 4,000,000 cu. ft. daily open flow, and pressure at 500 psi. This well was spudded February 7 on lands farmed out by Dyer from The California Co. Surface geology and geophysical work has been done on the block by both operators and a checkerboard spread of 2,200 acres was acquired by Dyer in exchange for a well on the structure. This well is on the west side of the Denver Basin, where several wildcats are now drilling and others are planned. Production from the Muddy and Dakota has been found at the Boulder, Clarks Lake, Ft. Collins, and Wellington fields in Colorado and at Horse Creek, Wyoming. The California Co. recently tested oil in the Muddy at the Borie wildcat, Laramie County, Wyoming, 60 miles north of the Dyer Loveland well. California's well is now coring in Dakota below 8,700 ft., with no shows in that formation.

Additional saturation was logged by Phillips Petroleum Co. and Pioneer Oil Corp. at the first deep test in Golden Eagle field, Hot Springs County, Wyoming. The well is 1 Golden Eagle, NW SE 12-45n-97w, and top of Phosphoria was logged at 9,055 ft. On drill-stem test in the top of the formation the well made 5,040 ft. of 42°-gravity oil, and on another test between 9,131-90 ft. the well made 30 ft. of oil and 195 ft. oil and gas-cut mud, with no water in 1 hour. The operator is drilling ahead for a test of the Tensleep prior to completing the well. The deepest previous test on this structure stopped in Morrison and the Lakota, Muddy and Mesa Verde have been productive in the field.

Atlantic Refining Co.'s Riverton wildcat at 1 Tribal, C SW SE 25-1s-4e (WRM), Fremont County, Wyoming, is now drilling below 11,723 ft. in saturated Tensleep sand. Top of the Tensleep was found at 11,661 ft. (?), and saturated cores were recovered in the first 30 ft. of sand. The formation hardened considerably and at the present depth drilling time reportedly indicates very hard sand. This wildcat tested gas and distillate in the Frontier and Phosphoria formations. The well is 4 miles north of Stanolind Oil & Gas Co. Beaver Creek field, which produces gas from the Morrison sand. Stanolind is now drilling a deep test in Beaver Creek field, and this well also found saturation in the Tensleep, with the majority of the sand hard and tight. The well is now drilling below 10,800 ft., and is projected as a test of Madison after cementing casing on top of the Tensleep.

Operations have been suspended indefinitely on Amerada Petroleum Corp.'s 3 Hougen in Melstone field, Musselshell County, Montana. The well is ½ mile south of the company's discovery well, which flowed oil from the Amsden. Saturation was found in the No. 3 well, but the formation tested only water with slight amounts of oil. The company is drilling a deep test in the field at 2 Hougen and this well is now below 6,675 ft. The latter well is scheduled as a test to Cambrian below 7,300 ft.

New locations.—Due to severe winter weather throughout the Rocky Mountain region, only 3 new locations were made during the week. These were in Wyoming, and were for pool wells in the Skull Creek-Mush Creek area of Weston County.

Completions.—There were five completions, with four in Wyoming and one in Montana. Total daily initial production was 765 bbl. of oil from these wells.

In Wyoming Seaboard Oil Co. and Husky Refining Co. completed the discovery at

Little Sand Draw, Hot Springs County, for a gage of 250 bbl. of oil daily through 22/64-in. choke from Tensleep. The well also made oil on drill-stem tests of the Phosphoria, but this formation was cased off for later development drilling.

WYOMING SUCCESSFUL WILDCAT

Little Sand Draw, Hot Springs County: Seaboard Oil Co. and Husky Ref. Co. 1 Gov't., NW NE SW 2-44n-96w, 6,119 TD, flowed 250 BOPD 22/64-in. choke. Dakota 3,840, Fuson 4,005, Lakota 4,078, Red Beds 4,720, Embar 5,831, Tensleep 6,055, 7-in. csg. 6,055. El. 4,781 RB.

EASTERN TEXAS

Sabine County Wildcat Still Unchanged

DALLAS.—Humble Oil & Refining Co. Sabine County wildcat, 1 J. W. Minton, Shadrich Morris Survey, 9 miles northeast of Hemphill, was unchanged at 6,535 ft., total depth. Operators continued mixing mud and conditioning hole. It started losing mud to the formation when it reached 6,535 ft., about a week ago. Circulation was restored at 3,510 ft., but it gained mud. It was then allowed to flow until salt content increased from 300 to 1,780 ppm., and mud weight was increased from 10.2 lb. to 10.6 lb., at which point it regained circulation and gained approximately 100 bbl. of mud in pits.

Gulf Oil Corp. 1 John Veach, Bowie County test, was reported in the Travis Peak drilling below 7,497 ft. in sand and shale. Jack W. Frazier et al 1 J. C. Steubenrauch, Pedro Varella Survey, northwest of Mexia in Limestone County, was drilling below 6,925 ft. Sample top on the Travis Peak was 6,440-70 ft. Humble Oil & Refining Co. 1 Thurman Crawford, west of Linn Flat in Nacogdoches County, was below 6,190 ft. in lime and shale. Location is 660 ft. from northeast line and 660 ft. from north line of a 142-acre tract in the Simri Bennett Survey. It was said to be running approximately 57 ft. high on the Comanche lime top, placed at 4,070-80 ft., by samples. Elevation is 363 ft.

In northern Panola County, Union Oil Co. 1 Harrison, William Allen Survey, 1-mile northeast outpost to the North Beckville Pettit limestone discovery, ran a drill-stem test on casing perforations at 6,473-6,500 ft. Details were not in on last report. The section was acidized with 1,000 gal., then with 10,000 gal., but did not start flowing.

In Wood County, 3½ miles northeast of Quitman, Morris Coats 1 Gilbreath, Stark Survey, perforated casing in the sub-Clarksville sand at 4,508-20 ft. The first run of the swab recovered a small amount of oil and the second run recovered drilling mud. Operators believed the mud was due to a faulty cement job. Perforations were squeezed then the section reperforated for further testing.

In northern Wood County, 9 miles north of Hawkins, Bert Fields 1 Carlock, Yarberry Survey, was drilling below 3,040 ft. It is a Paluxy exploration.

EAST TEXAS (DISTRICTS 5 & 6) SUCCESSFUL WILDCAT

Cherokee County: Standard Oil Co. of Texas 1 T. E. Acker, T. R. Walker Sur., 2½ mi. NW Maydell, perforated 8,610-50 ft. in Bacon lime, flowed 5,095,000 cu. ft. gas daily, plus 24 bbl. distillate, estimated open flow potential 10,250,000 cu. ft. gas daily, rock pressure 3,543 psi., TD 8,763 ft., PB 8,655 ft., elev. 500 ft.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURES

Bosque County: J. M. Passwaters 1 E. E. Erickson, N. McGee Sur., 4 mi. N Clifton, dry, TD 610 ft., water sand 546-600 ft.

Collin County: Standard Oil Co. of Kansas 1 E. F. McIntire, Clayton Rogers Sur., 1½ mi. N Frisco, dry, TD 6,856 ft.

Kaufman County: Humble Oil & Refining Co. 1 E. N. Rylie, Gregorio Yarbo Sur., 6 mi. SW Prairieville, dry, TD 7,063 ft., Nacatoch 725 ft., Austin 2,490-3,070 ft., Woodbine 3,375 ft., Comanche 3,985 ft., Glen Rose 5,295 ft., Massive 6,250 ft., by samples.

MICHIGAN

New Dundee Strike in Oceana County Is Tested

MOUNT PLEASANT.—Another potentially important Dundee strike was under test in Oceana County this week, continuing the current trend of interest and development on the western rim of the Michigan basin.

McClanahan Oil Co. and George F. Herr 1 Dykstra, NE SE NE 34-15n-18w, Golden Township, Oceana County, tapped a dolomitic Dundee oil pay at 2,211 ft. which showed 1,000 ft. of free oil natural in 20 hours and made one head flow natural through 5-in. casing of 43 bbl. in 50 minutes after well had been shut in for approximately 72 hours. Next day after initial flow, fluid level stood at a point between 1,500 and 1,600 ft. No water was showing with oil and tubing was run with acid treatment with 500 gal.

Operating companies control a lease block of approximately 1,500 acres around this wildcat, while Carter Oil Co., who had previously core drilled in the district, controls several thousand acres of leases and was

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major contributor towards drilling this test well.

This newest Golden Township well should not be confused with another district in the common corners of Sections 8 and 18-15n-18w, some 5 miles to the northwest, where Welsh Oil Co. has two Dundee wells under test in that horizon with oil showing.

As was indicated from preliminary reports last week, all offsets and follow-up tests in the Trent-Casnovia area, Muskegon County, were dry in the Traverse objective with the exception of Rex Oil & Gas Co. 3 Herman, located approximately ½ mile northwest of Degenther 1 Herman discovery. The Rex completion was rated good for 25 bbl. of oil a day following acidization.

MICHIGAN WILDCAT FAILURES

Allegan County, Valley Township: Ohio Oil Co. C. T. A-26 U. S. of America, SW NW NW 27-2n-14w, dry in Traverse, TD 1,371 ft.

Clare County, Hatton Township: Union Development Co. 1 Magnus et al, SE SE SW 22-18n-4w, dry in Detroit River, TD 4,250 ft.

Hillsdale County, Amboy Township: Clifford A. Perry 1 Houtz, NW NW SW 4-9s-3w, dry at 3,196 ft.

Mecosta County, Austin Township: Chapman Oil Co. and Union Development Co. 1 Proctor, NW NW SW 12-14n-9w, dry in Monroe, TD 3,780 ft.

Montcalm County, Evergreen Township: Columbia Oil & Gas Co. 1 Cleary-Daoust, NW NW NW 3-10n-6w, dry in Dundee, TD 3,416.

Muskegon County, Dalton Township: Muskegon Oil Corp. 1 Hawkins, SW NE NW 3-11n-16w, dry in Traverse, TD 1,915 ft.

St. Clair County, Port Huron Township: William J. Morriss 2 May, SE SE SE 32-7n-17e, dry in Dundee, TD 633 ft.

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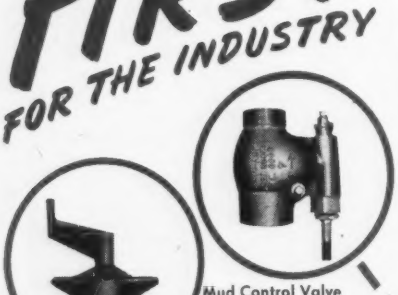

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OHIO, KENTUCKY

Perryton Oil Pool Gets Good Extension

COLUMBUS.—An east extension to the Perryton pool in Jackson Township, Muskingum County, furnished the best of the completions for the week. Allen Willey et al 1 John Lewis, Lot 6, a north offset to their big 1 J. W. Ridgeway, topped the Clinton at 3,152 ft. and flowed 80 bbl. of oil natural while drilling in to the last reported depth of 3,206 ft. The same operator's 1 E. E. Ashcraft, Lot 6, a ¼-mile offset to the east, logged the Clinton at 3,209-65 ft. with 591,000 cu. ft. of gas and a show of oil natural. The well finished at 3,274 ft. and is to be shot. The Pure Oil 3 Myrtle Frazier, Lot 15, a south offset to the Ridgeway, made 78 bbl. of oil in 24 hours, after shot, from the Clinton at 3,127-84 ft. Beasley & Lynn 2 F. A. Moore, Lot 16, ½ mile to the south, found the Clinton at 3,183-3,237 ft. with a good oil showing. After a 150-qt. shot the well flowed 120 bbl. and swabbed 20 bbl. in 24 hours Lynn & Smith 1 Jonathan McDonald, Lot 19, 1¼ miles to the east, gaged 200,000 cu. ft. of gas with 250 ft. of oil from the Clinton at 3,239-94 ft. After a 25-qt. shot, the gage was 350,000 cu. ft. of gas with 18 bbl. of oil the first day.

The Freuhauf Trailer Co. will make a third attempt to open a gas pool in northwestern Avon Township, Lorain County. The 1 Klingshirn, Section 8, had only a show of oil; the 2 Klingshirn, ½ mile to the east, was shut in on the casing as a small gasser; and the next test is to be ½ mile further northeast.

OHIO SUCCESSFUL WILDCAT

Lorain County, Wellington Township: G. B. Harmon et al 1 Lorain County Agriculture Society, Lot 34, Clinton 2,252-54 ft., 2,286-91 ft., 884,000 cu. ft. of gas, TD 2,318 ft.

OHIO WILDCAT FAILURE

Lorain County, Penfield Township: Ohio Fuel Gas Co. 1 Frank Krukurka, Lot 60, no Clinton, TD 2,645 ft.

EASTERN KENTUCKY

ASHLAND.—In Johnson County, 3-Q-80, and on Williams Branch of Mudlick Creek, Crate Rice et al of Paintsville, Ky., is drilling at 2,135 ft. in Corniferous lime topped at 1,565 ft. Objective is the Big Six sand expected at about 2,200 ft. Test is located on the southeast flank of the Laurel Creek dome. Well is on the Williams tract.

Four miles from the above test and situated higher on the Laurel Creek structure, Ashland Oil & Refining Co. is shut down for repairs at 2,780 ft. Well is located on Wallace Williams farm and located in 19-R-79, Johnson County.

In southern Fleming County, 14-V-71, Edward Lillie et al of Cincinnati, Ohio, are bottomed at 2,132 ft. in Knox dolomite topped at 1,590 ft., on their 2 John Riley wildcat. Operators are going to run 4⅞-in. casing to test show of oil in bottom of hole.

EASTERN KENTUCKY WILDCAT FAILURE

Magoffin County: 17-N-77, Diederich & Ware 1 Louisa Craft, dry, TD 2,524 ft., Weir 1,521 ft., Berea 1,700 ft., Corniferous 2,216 ft., Big Six 2,460 ft.

WESTERN KENTUCKY

OWENSBORO.—J. C. Ellis has completed two more Palestine wells in Section 4 of P-28, northern part of Griffiths area in Daviess County. The completed wells were: Ellis 17 Berry with initial production of 40 bbl. per day, and Ellis 1 Fee making 26 bbl. per day.

In the Tucker Hollow area of Ohio County, T. M. Galey has completed two more wells. The wells are shallow with the

Hardinsburg at about 400 ft. and the Benoist at about 600 ft. Galey 4 Tanner heirs, 20-M-30, was completed in the Benoist at 595-610 ft. for 18 bbl. per day. Galey 5 Tanner heirs, 20-M-30, made 20 bbl. per day from the Hardinsburg at 365-84 ft. and 387-90 ft.

The deep test in Webster County, Pure Oil Co. et al 1 M. L. Walker, 22-N-24, has passed the 6,000-ft. mark and was last reported drilling below 6,125 ft. The well is scheduled as a 7,500-ft. test.

In the Hitesville area of Union County, Carter Oil Co. has set casing at 1 Culver and Russelberg, SW NW SE 24-P-21, for further tests of the Waltersburg. The well had a slight show of oil at 1,695-1,700 ft. and a better show at 1,700-02 ft. Casing was set at 1,696 ft.

INDIANA

EVANSVILLE.—Vanderburgh County has a prospective pool opener in the area about 9 miles north of Evansville and about 2 miles southeast of Stacer pool in the northeastern part of the county. The well, S. D. Jarvis 1 Ira Barton, NE NE SE 34-4s-10w, had a recovery of 180 ft. of gas, 20 ft. of clean oil, 55 ft. of oil-cut mud, and 70 ft. of oil and gas-cut mud on a 2-hour drill-stem test of the Rosiclare at 2,172-80 ft. Bottom-hole pressure was 750 psi. Casing has been set for further tests.

In Vigo County, Leo Light has set casing for a test of the Devonian at 1 Park Sutliff, SE SW SW 11-11n-9w. The Devonian was found at 1,708 ft. and casing has been set on top of the pay. This well is the northeast diagonal offset to the opener of Spring Hill pool that made 200 bbl. per day from the Devonian.

In the upper part of Martin pool in Vanderburgh County, Potter & Reeves et al 3 C. E. Nunn, NW NW SE 30-4s-11w, has been completed in the Cypress at 2,220-26 ft. for 65 bbl. per day.

In the lower end of New Harmony, South pool of Posey County, Rush Creek Oil Co. 1-A McCorkle, NE SW NE 27-5s-14w, is pump testing the Cypress at 2,580-88 ft.

INDIANA SUCCESSFUL WILDCAT

Gibson County: Superior Oil Co. 1 Joseph Kolb, NW SE SW 22-1s-10w, IP 26 bbl., McClosky 1,872-80 ft. and 1,896-1,903 ft., TD 2,033 ft. (Discovery well for Kolb pool.)

INDIANA WILDCAT FAILURE

Posey County: Aurora Gasoline Co. et al 1 C. Rickens, NW NE NE 20-4s-13w, dry, TD 3,075 ft.

MISSISSIPPI

New Producing Level Found in Wilcox Sand

JACKSON.—A new producing level in the Wilcox sand for the big Cranfield field, Adams County, has been established at The California Co. 29 Ella G. Lees, 52-7n-1w. This well gaged on the first 24-hour tests at the rate of 84 bbl. of 31°-gravity oil through perforations at 4,362-70 ft., the shallowest production yet found in the field.

Gulf Refining Co. completed two producers in Baxterville field, Lamar County. The 17 J. M. Andrews, 5-1n-16w, drilled to a depth of 8,817 ft., was completed for an initial production on pump of 52 bbl. per day of 14.9°-gravity oil. The 18 Andrews, 6-1n-16w, was completed flowing 63 bbl. of oil per day. Total depth 8,854 ft.

In Heidelberg field-East, Jasper County, Southeastern Drilling Co. 1 L. H. Eddy, 33-1n-13e, was completed on pump for an initial production of 92 bbl. of oil daily. Total depth is 4,958 ft.

Humble Oil & Refining Co. B-15 G. M. & O. Land Co., 30-9n-7w, in Yellow Creek field, Wayne County, was drilled to a total depth of 5,177 ft., and completed on pump for gage of 25 bbl. of 18.6°-gravity oil per day.

Six development locations were reported this week, four being in the newly discovered Bude field in Franklin County, and two in LaGrange field, Adams County. One wildcat start was reported for Walthall County. One wildcat failure was completed in Scott County.

MISSISSIPPI WILDCAT FAILURE

Scott County: Continental Oil Co. 1 U.S.-D.A.-Vaughey, Center SW NW 15-8n-6e, dry, TD 7,122 ft. Top Eutaw 5,342 ft., Tuscaloosa 5,990 ft., Lower Tuscaloosa 6,843 ft., Lower Cretaceous 7,100 ft.

ALABAMA WILDCAT FAILURE

Washington County: Humble Oil & Refining Co. 2 J. R. Williams, Center SE NW 21-6n-4w, dry, TD 15,659 ft.

PERMIAN BASIN

Coke County Wildcat Is Two-Pay Prospect

MIDLAND.—Recovery of oil of Ordovician age on the east side of the West Texas Permian Basin has been reported at Union Oil Co. 1 Jack Frost, NE SE Section 269, Block 1-A, H&TC Survey, in northeastern Coke County.

On a 2½-hour drill-stem test of the Ellenburger from 6,569-83 ft., gas came to the surface in 25 minutes and recovery was 120 ft. of drilling mud, slightly cut with oil, plus 60 ft. of high-gravity green oil. There was no water. Elevation of the well is 2,223 ft. Top of the Ellenburger has not been reported.

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A second drill-stem test from 6,570-6,606 ft. had gas in 33 minutes and recovered 28 ft. of high-gravity clean oil, plus 150 ft. of heavily oil and gas-cut mud. The latter was said to be about 50 per cent oil. Operators drilled ahead to 6,641 ft. and were to run another test with packer at 6,606 ft.

The Ellenburger is the second pay prospect for the wildcat. A 100-minute drill-stem test from 3,980-93 ft., in unidentified formation, recovered 5 ft. of distillate and 70 ft. of distillate-cut mud.

Location of the 1 Frost is 4 miles west and about 1 mile south of the town of Blackwell, Nolan County, and about ½ mile south of the Nolan County line. It is approximately 8 miles northeast of Marble Falls production in the Arledge field, where some wells showed for small production in the Ellenburger.

Gulf Oil Corp. 135-E Keystone, northeast Winkler County Devonian discovery, 16 miles northeast of Kermit, in NE NW Section 2, Block B-1, PSL Survey, drilled plug on 7-in. casing set to 9,635 ft., then kicked off after swabbing in. In 30 minutes, flowing through ½-in. choke, it gaged 30 bbl. of oil, then tanked 60 bbl. of fluid in 60 minutes, the latter being cut with 3 bbl. of sediment and drilling water. Gas-oil ratio was 1,236 cu. ft. Flowing tubing pressure was 800 psi. It continued flowing to clean and test.

In the Shafter Lake field, Andrews County, Texas Pacific Coal & Oil Co. 1-F University was to try for completion in the Ellenburger after a 5-hour and 10-minute drill-stem test from 11,794-819 ft. flowed 28 bbl. of oil to storage in 90 minutes. When the tool was opened it had gas in 28 minutes, oil in 2 hours and 35 minutes; then cleaned into pits for another 35 minutes. Gas-oil ratio was 404 cu. ft. Open flowing bottom-hole pressure was 3,500 psi. Additional oil was recovered as the drill pipe unloaded all the way out.

The 1-F University is expected to complete as the second Ellenburger well in the field. Texas Pacific's 2-F University recovered oil on a drill-stem test of the Ellenburger from 11,660-737 ft., but details of the test were not available at last report. It continued drilling below 11,013 ft. in lime. The 2-F University is ¼ mile west and ½ mile north of Sinclair and others' 2-154 University, Ellenburger discovery. The 2-F University was said to be running 153 ft. high, on the Ellenburger, to the discovery.

In Scurry County, Magnolia Petroleum Co. staked location for its 1 A. B. Eicke, wildcat located 660 ft. out of the southwest corner of Section 209, Block 97, H&TC Survey, 4 miles west of Snyder and 1⅜ miles northwest of its 1 H. G. Moore, Pennsylvanian discovery. On last report, the 1 Moore washed the Canyon limestone with 1,200 gal., through perforations at 6,845-65 ft., then flowed 161 bbl. of 41.2-gravity oil, plus 25 bbl. of sediment and water, on a 24-hour gage through 5/32-in. choke.

Humble Oil & Refining Co. 1 Perriman, west outpost to the Dermott field, developed salt water on a drill-stem test from 7,073-93 ft., and plugged back to 7,070 ft. It will try for completion at 7,050-70 ft., according to reports. On a test from 7,050-73 ft. open 5¾ hours, the well cleaned into pits for 4 hours and 28 minutes, at the rate of 15-20 bbl. of clean oil an hour.

Standard Oil Co. of Texas 3-1 Brown, south offset to the field discovery, ran a drill-stem test in the Canyon lime from 6,700-50 ft. and flowed 31 bbl. of oil an hour. It gaged about half that amount on a test from 6,750-6,825 ft. This well has indicated pay sections extending over some 500 ft., which have gaged from 17-60 bbl. of oil an hour on tests which did not overlap any pay section.

Gulf Oil Corp. 3-G-C Hattie Connell, Section 27, Block B-22, PSL Survey, San Andres pay discovery in C-Bar (Silurian and Connell), field of northern Crane County, kicked off and flowed by heads through drill pipe. It averaged around 6 bbl. of oil an hour for 10 hours, after which packer was pulled, tubing run and mud displaced with oil for further testing. Total depth was 3,549 ft., with casing set to 3,314 ft. Location is a northwest offset to the Silurian discovery and ⅝ mile northeast of Connell sand production.

Humble 1 J. M. Cowden, Section 58, Block X, CCSD&RGNG Survey, 3½ miles southwest of the Block 31 field, drill-stem tested from 10,590-725 ft., open 44 minutes, and recovered 925 ft. of water blanket and 15 ft. of drilling mud with no shows. Operators prepared to run another test on the Ellenburger.

In northwest Loving County, Intercoast Petroleum Corp., Midland, 1 TXL, was showing for a ½-mile north extension of Delaware sand production. On an elevation of 3,096 ft., it topped the Delaware lime at 3,910 ft., sand at 3,939 ft., and pay at 3,960 ft. A total depth of 3,974 ft. it was still in the pay sand, with no water. Operators ran tubing to complete after it filled up 700 ft. with oil in 3 hours.

WEST TEXAS (DISTRICTS 8 & 7-C)
WILDCAT FAILURES

Andrews County: J. C. Barnes 1 Munger

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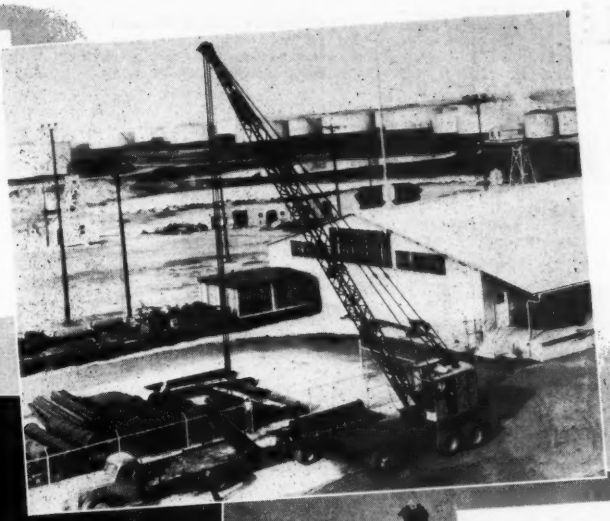

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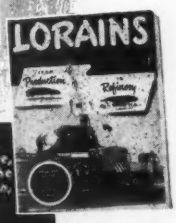

Request your copy of the attractive, illustrated booklet, "Lorains in the Petroleum Industry". No obligation, of course.

& Nix, Sec. 1, Blk. A-41, PSL Sur., dry, TD 7,507 ft.

Frank & George Frankel 1 Texas University "104," Sec. 14, Blk. 9, University Lands Sur., dry, TD 6,125 ft.

McCulloch County: McDaniel & Beecherl 1 O. E. Helge, IRR Sur., 1 mi. W Melvin, dry, TD 3,101 ft.

Pecos County: W. L. Goldston 1-A Prince, Sec. 110, Blk. 3, T&P Sur., dry, TD 3,215 ft., Yates 2,380 ft., Queen sand 3,130 ft., elev. 3,377 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Mid-Continent Petroleum Corp. 1-B Sawyer, 34-9s-36e, south offset to the Crossroads discovery well, has been bottomed at 12,750 ft., with 5½-in. casing cemented at 12,514 ft. On a 1½-hour drill-stem test at 12,560-12,750 ft. using a 3,720-ft. water blanket, recovery was the water blanket with no shows. Operators are preparing to make production tests farther up the hole, where the well has shown for a new pay horizon in the field from the Mississippian at 12,375-12,460 ft.

Mid-Continent's 1 Dessie Sawyer, 27-9s-36e, is slated to be completed as the third Devonian producer in the Crossroads field. Operator is planning to acidize above and below the interval which has shown for commercial production, preparatory to further testing of the new zones.

The field received its first failure at Skelly Oil Co.'s 1 Sawyer, 33-9s-36e, ¾ mile southwest of the pool opener. The venture was low structurally to the Crossroads discovery, and was completed as dry at 12,741 ft. when no indications of oil or gas had been found.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCAT

Lea County: Stanolind Oil & Gas So. 1-U State, SE SE 2-20s-38e, 6½ mi. S Hobbs, pumped 41 bbl. 39°-gravity oil and 46 bbl. salt water, Tubb 6,990-7,149 ft., TD 10,014 ft., PB 7,149 ft., San Andres 4,315 ft., Glorietta 5,610 ft., Tubb 6,610 ft., Devonian 7,976 ft., Fusselman 8,700 ft., Montoya 9,015 ft., Simpson 9,310 ft., McKee 9,604 ft., Ellenburger 9,900 ft., Cambrian 9,985 ft., pre-Cambrian 10,005 ft., elev. 3,580 ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Chaves County: Martin Yates, Jr., 2 Mullis, SW SW 28-15s-29e, dry, TD 1,725 ft., show gas, and water, 1,715 ft.

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Johns-Manville TRANSITE PRESSURE PIPE

LA.-ARK.

Ouachita Parish Test Drills Below 9,000 Ft.

SHREVEPORT. — The California Co. 1 Brown Paper Mill, 10-16n-3e, Ouachita Parish deep wildcat, 5 miles south of Monroe, was believed to be in the Cotton Valley although laboratory analysis of drill samples had not been reported. On last report it was drilling below 9,002 ft. With elevation of 106 ft., it had electric log tops on the James at 5,315 ft., Pine Island 5,444 ft., and the Travis Peak at 6,000 ft.

In Bossier Parish, Barnsdall Oil Co. 1 Ardis & Co., 27-22n-11w, was drilling below 6,385 ft. in Travis Peak. It has reported no shows below a sand around 2,965 ft. Three miles west of Plain Dealing, M. T. Halbouty 1 Hall-Zeigler, 7-22n-13w, was dry in the Tuscaloosa at 3,505 ft. It had slight shows of oil in cuttings at 2,719-22 ft., but a drill-stem test from 2,710-30 ft. recovered mud. A core from 3,377-3,400 ft. recovered sand and shale with no shows.

Hunt Oil Co. 1 John R. Smith, 10-23n-7w, north outpost to the East Haynesville field, Claiborne Parish, was drilling below 9,172 ft. In 34-20n-5w, between the Sugar Creek and Lisbon fields, H. W. Klein 1 A. H. Sims was drilling in the Cotton Valley at 8,606 ft.

Continental Oil Co. 4 Singer Manufacturing Co., 2-15n-11e, Madison Parish, was drilling below 5,260 ft. The only formation top to be reported at this time is the Wilcox at 2,325 ft., on elevation of 88 ft. Continental's 1 Mansfield, 34-13n-4w, Winn Parish, was in the Glen Rose, drilling below 8,312 ft. It had base of the Massive anhydrite at 7,546 ft., with elevation of 173 ft.

In Arkansas, development drilling in proven areas was reported to be about normal, but exploration activity remained at a low pace. Columbia County gained a new wildcat 6 miles north of the Shongaloo field at J. A. Funston 1 C. E. Franks, NW NW SE 25-19s-22w. On last report it was drilling below 3,455 ft., in Cretaceous material. Location is on a subsurface prospect.

Petroleum Investments, Inc., 1 M. L. Sigman, 25-11s-8w, Drew County wildcat 8 miles northwest of Monticello, had penetrated to 205 ft. when it was shut down by high water. Proposed depth is 5,000 ft.

C. M. Bagley 1 Union Saw Mill, 28-19s-13w, Union County, had total depth at 2,308 ft. in the Nacatoch and was shut down for orders. Cores from 2,226-48 ft. recovered 19½ ft. of gray and white shale with streaks of sand having faint oil odor and stains, but low porosity.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: M. T. Halbouty 1 Hall Zeigler, NW NE 7-22n-13w, dry, TD 3,505 ft., Nacatoch 1,810 ft., base Annona 2,600 ft., Buckrange sand 2,719 ft., Lewisville 3,375 ft., elev. 409 ft.

Red River Parish: Chicago Corp. 1 H. L. Gholson, 37-14n-10w, dry, TD 3,120 ft., Nacatoch 1,039 ft., Saratoga 1,280 ft., Buckrange 1,800 ft., elev. 161 ft.

Sabine Parish: Hassie Hunt 2 Whitney Corp., NE SW 19-10n-13w, dry, TD 3,345 ft.

ARKANSAS WILDCAT FAILURE

Little River County: Lee & Burnett 1-A

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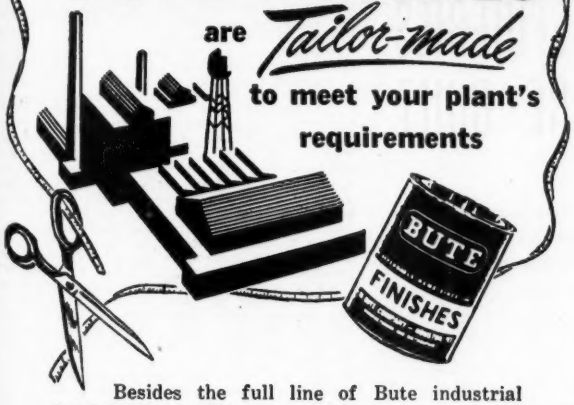

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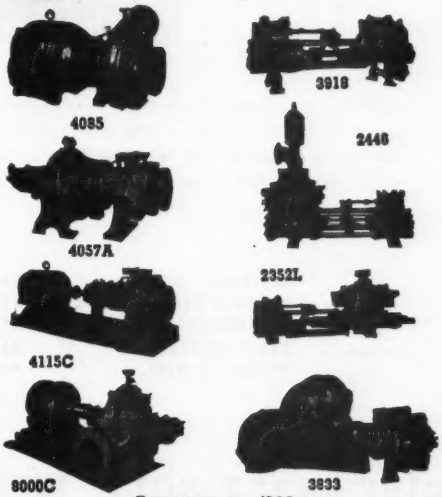

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Wm. Sivley, SE SE SE 35-12s-31w, dry, TD 3,678 ft., Massive anhydrite 2,462 ft., Paleozoic 3,630 ft., elev. 343 ft.

ILLINOIS

White County Gets Prospective Pool Opener

MATTOON.—Calvert & Willis, Inc., Mahutska Oil Co., and Elm Oil Co. have a prospective pool opener on the western side of White County at 2 Kirk Heirs, S½ SE SW 29-4s-8e, where operators have set casing for further tests of the Aux Vases. A 2-hour drill-stem test at 3,385-3,414 ft. had gas in 27 minutes and recovered 360 ft. of oil, 120 ft. of oil-cut mud, and 60 ft. of salt water. The new well is about 3 miles east of Bungay pool and about midway between Enfield and Springerton.

Jasper County has a new pool in the area east of the north portion of Clay City-Noble Consolidated pool. The pool, Ste. Marie, West, was opened by V. W. Smith and M. S. Coffman 1 W. Ochs, SE SW NE 35-6n-10e, with initial production of 175 bbl. per day from the McClosky at 2,812-14 ft. The pay was treated with 2,000 gal. of acid. Total depth is 2,844 ft. The well is about 2 miles west of the town of Saint Marie.

The same operators have started a west offset at 2 Ochs and have staked location for the north offset at 3 Ochs. The south offset, Bell Brothers 1 Esther Hutton et al, has been drilled to 2,840 ft. and operator has set casing for tests of the McClosky.

In Lawrence County, William McGill has set casing at 1 S. Crane, NE NW NE 32-3n-12w, for tests of the Aux Vases. A 40-minute drill-stem test at 2,129-33 ft. had gas in 30 minutes and recovered 180 ft. of oil and 120 ft. of mud-cut oil. The well also had a show of oil in the Benoist at 2,032-37 ft.

ILLINOIS WILDCAT FAILURES

Gallatin County: Dudley Heath 1 William Mettsdorffer, NW NW NE 24-8s-8e, dry, TD 2,259 ft.

Fayette County: P. Doran 1 C. Johnson, SE NW NE 28-6n-2e, dry, TD 1,913 ft.

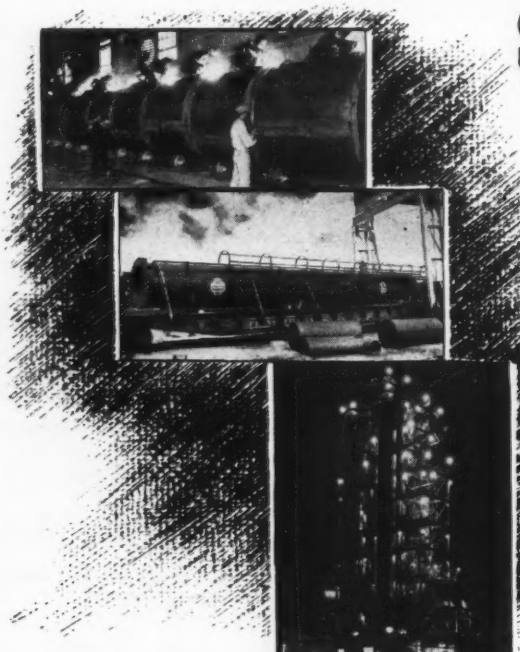
Macoupin County: Edward White 1 R. H. Bell, SE NW NW 11-10n-6w, dry, TD 660 ft.

Marion County: Nation Oil Co. 1 Shreffler, NW NW SW 1-3n-2e, dry, TD 2,234 ft.

Richland County: C. G. Davis et al 1 S. E. Lewis, NE NW SE 11-3n-9e, dry, TD 3,053 ft.

LEGAL

Department of the Interior, Wind River Indian Agency, Fort Washakie, Wyoming, February 14, 1949. Notice is hereby given that SEALED BIDS will be received and opened in the Office of the Superintendent of the Wind River Indian Agency, Fort Washakie, Wyoming at 2:00 P.M. March 15, 1949, for the leasing of the following parcels of ceded and restored tribal Indian lands for oil and gas mining purposes. Township 3 North. Range 1 West, W.R.M. Wyo. Unit No. 1 SW¼ SW¼, Section 11, containing 40 acres Tribal land. Unit No. 2 NW¼, Section 14, containing 160 acres Ceded Tribal land. Unit No. 3 NW¼ NE¼, N½ NW¼, Section 23, containing 120 acres Ceded Tribal land. Each of the foregoing parcels are being offered and leases will be drawn on the applicable government forms. The right is reserved to reject any and all bids. Bids may be made on one or more of the described units. The successful bidder or bidders will be required to pay the cost of the advertisement. The lessee or lessees must pay as advance rental $1.25 per acre per annum. The leases will be sold to the highest bider for a bonus offer upon an acreage basis in addition to the royalty of 12½%. The successful bidder or bidders must deposit with the Superintendent of the Wind River Indian Agency, on the date of the sale a certified check or bank draft on a solvent bank in an amount equal to 20% of the bonus bid and of the first year's rental as a guaranty of good faith. The checks are to be made payable to the Treasurer of the United States. The lease must be completed and filed with the Superintendent within 20 days from the date it is received by the lessee for execution and returned with the remainder of the bonus bid, the balance of the first year's rental and a filing fee of $10.00 for each lease. Failure in any of these conditions may subject the bid to cancellation without further notice and forfeiture of payments already made. The lease on Unit No. 1 will be leased pursuant to the Act of May 11, 1938 (52 Stat. 347), and the regulations, Part 186, Title 25, C.F.R. for a term of 10 years and as long thereafter as oil and/or gas is produced in paying quantities. The lease on Units 2 and 3 will be leased pursuant to the Act of August 21, 1916 (39 Stat. 519) and the regulations, Part 192, Title 25, C.F.R. for a term of 20 years from the date of approval by the Secretary of the Interior with preferential right in the lessee or lessees to renew the same for succesive periods of 10 years each upon such reasonable terms and conditions as may be prescribed by the Secretary of the Interior, unless otherwise provided by law at the expiration of any such period. The rate of royalty on the three units will be 12½% of the value of all oil, gas and/or natural gasoline, unless the lessor with the approval of the Secretary of the Interior elects to take royalty in kind. The adequacy of the bonus offers will be determined by the Geological Survey. A suitable bond will be required and such bond must be approved by the Department. The responsibility of complying with any requirements of the Federal Documentary Stamp Statutes will be left with the successful lessee. All bids should be addressed to the Superintendent, Wind River Indian Agency, Fort Washakie, Wyoming in a plain envelope marked: Bid for Oil and Gas Mining Lease North Pilot Butte Field, to be Opened March 15, 1949. For further information call or write the Land Division of the Wind River Agency. J. M. Cooper, Superintendent.



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January Completions Slowed by Cold Weather

by Polly De Armond

PRELIMINARY summaries seem to indicate that drilling during January, an ordinarily poor month for operations in any given year, was not too seriously hampered by the severe winter weather throughout the month. In comparison with January 1948, total new wells completed dropped only 65, or 2 per cent, the ratio of successful oil or gas completions remained about the same, and footage was down very little.

Deep Drilling

The total depth drilled for 3,099 wells in January 1949 was 11,184,468 ft. against 11,201,695 ft. for 3,164 wells in the same month of the previous year. These figures plus increases in the two greater depth classifications (the most notable being a 56 per cent gain in wells drilled over 10,000 ft.), indicate that operators have begun their planned deeper-drilling program for this year.

Some Increases

Two sections reflected gains in the January vs. January comparison. The North Central division, including Ohio, Indiana, Kentucky, Illinois, and Michigan, reported 74 more wells, an increase of 15.7 per cent, and a net gain of 156,767 ft., or 12.3 per cent. Completions in the Texas-New Mexico section were up 38, or 3.6 per cent, and footage rose 184,082 ft., or 4 per cent.

The southern states of Louisiana, Arkansas, Mississippi, Alabama, Georgia, Florida, and Tennessee dropped 18 wells, or 7 per cent, but noted a 3 per cent increase in footage, exceeding that drilled during January 1948 by 37,054 ft.

Declines Reported

Of the groups reporting declines in both categories, the eastern area (New York, Pennsylvania, and West Virginia) noted the smallest percentage decrease: down 8.1 per cent in wells and 5.1 per cent in footage.

The Mid-Continent district, including Oklahoma, Kansas, Nebraska, Missouri, and Iowa, had a decrease of 75 completions, or 11.7 per cent, and was off 162,936 ft., or 7.5 per cent, from last year.

Western U. S.

Percentagewise, the greatest decreases occurred in the western half of the nation, where the weather was particularly bad during the month. The Rocky Mountain region, including Colorado, Utah, Montana, and Wyoming, completed an aggregate total of 81 wells, down 22, or 21.4 per cent, from January 1948, and drilled a total of 312,641 ft., a decrease of 198,613 ft., or 38.1 per cent. Along the Pacific Coast, completions dropped 12.2 per cent.

SUMMARY OF COMPLETIONS, JANUARY 1949

	Total comp.	Oil	Initial prod.	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	Over 10,000 ft.	Total footage	Rigs and drilling
New York	106	53	173	0	53	106	0	0	0	0	151,549	127
Pennsylvania	210	102	229	18	90	197	13	0	0	0	349,095	264
West Virginia	45	10	95	23	12	19	22	3	1	0	137,273	161
Ohio	111	35	760	34	42	50	59	2	0	0	273,774	177
Indiana	98	37	1,746	2	59	80	18	0	0	0	180,288	104
Kentucky	58	30	2,165	6	22	47	11	0	0	0	94,777	43
Illinois	204	102	11,579	1	101	68	136	0	0	0	545,410	244
Michigan	71	24	2,109	3	44	42	29	0	0	0	163,021	120
Kansas	244	127	48,819	16	101	28	216	0	0	0	791,808	362
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	0	0	0	10
Oklahoma	323	197	21,646	10	116	96	133	76	11	7	1,214,694	600
Texas	1,055	635	106,311	63	357	264	430	207	116	38	4,613,163	1,149
North	169	83	6,209	0	86	97	44	28	0	0	455,146	167
West Central	165	77	8,721	2	86	54	99	12	0	0	500,660	110
West	240	213	64,787	2	25	41	92	51	34	22	1,270,936	269
Panhandle	89	45	3,260	34	10	2	87	0	0	0	277,524	130
Eastern	51	33	3,943	2	16	6	29	12	4	9	239,190	53
Gulf Coast	168	87	10,841	19	62	12	41	48	53	14	1,081,309	225
Southwest	173	97	8,550	4	72	52	38	56	25	2	788,398	195
Louisiana	188	133	15,011	13	42	77	21	28	30	32	1,006,837	231
Northern	113	81	5,974	12	20	76	14	15	6	2	340,696	60
Southern	75	52	9,037	1	22	1	7	13	24	30	666,141	171
Arkansas	12	4	780	0	8	4	3	3	2	0	51,628	28
Mississippi	28	13	2,183	2	13	0	4	14	6	4	201,606	36
Ala., Ga., Fla.	4	1	335	0	3	0	1	1	0	2	35,270	10
Tennessee	7	1	30	0	6	7	0	0	0	0	7,923	10
Montana	17	9	395	4	4	10	6	1	0	0	44,177	79
Wyoming	48	30	4,898	0	18	11	26	5	4	2	187,291	219
Colorado-Utah	16	8	1,739	1	7	3	2	9	2	0	81,173	71
New Mexico	39	22	4,384	3	14	9	22	8	0	0	179,719	119
California	215	164	25,214	1	50	70	98	31	10	6	873,992	290
Total January 1949	3,099	1,737	250,601	200	1,162	1,188	1,250	388	182	91	11,184,468	4,454
Total December 1948	3,636	2,036	306,177	269	1,331	1,341	1,540	447	207	101	13,091,793	4,961
Total January 1948	3,164	1,786	286,043	265	1,113	1,192	1,329	406	173	64	11,210,695	4,430

*Incl. 157 service wells: N. Y. 53, Pa. 88, Ohio 4, Ky. 1, Kans. 3, Okla. 4, No. Tex. 3, No. La. 1. †Incl. 29 distillate wells: Okla. 5, W. Tex. 4, E. Tex. 2, Tex. Gulf 5, No. La. 4, So. La. 7, New Mex. 2. ‡Incl. all wells rigged up and/or drilling at end of month.

STATISTICS and

WEEKLY WELL COMPLETIONS . . WEEK ENDED FEBRUARY 19, 1949

	Total of all wells							Wildcat completions and discoveries									
						7 wks.							Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	25	13	0	*12	24,036	152	206	0	0	0	0	0	0	0	0	0	0
Pennsylvania	32	14	4	†14	52,466	252	389	0	0	0	0	0	0	0	0	1	1
West Virginia	6	0	6	0	16,133	73	103	0	0	0	0	0	0	0	1	2	3
Ohio	24	9	9	‡6	53,866	162	140	0	0	1	1	2	0	0	1	6	7
Indiana	9	5	0	4	12,901	125	123	0	0	0	1	1	1	0	0	22	23
Kentucky	12	5	0	7	21,761	101	86	1	0	0	1	2	2	0	0	6	8
Illinois	50	29	1	20	128,458	288	256	0	0	0	5	5	3	0	0	47	50
Michigan	23	8	0	15	45,289	132	93	0	0	0	7	7	3	0	1	49	53
Kansas	49	30	3	16	153,710	382	376	0	0	1	6	7	8	0	2	50	60
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	50	32	1	17	217,054	446	500	1	2	0	6	9	24	5	1	66	96
Texas	201	129	17	55	819,279	1,645	1,357	6	1	0	39	46	55	3	12	276	346
North Central (Dist. 7-B & 9)	67	42	0	25	207,148	507	405	3	0	0	18	21	28	0	1	116	145
West (Dist. 7-C & 8)	43	35	3	5	213,683	355	365	0	0	0	4	4	6	0	0	23	29
Panhandle (Dist. 10)	27	13	11	3	86,884	183	63	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	7	4	0	3	35,744	86	66	0	1	0	3	4	0	1	1	16	18
Gulf Coast (Dist. 2 & 3)	23	16	1	6	136,065	250	240	2	0	0	5	7	11	1	8	56	76
Southwest (Dist. 1 & 4)	34	19	2	13	139,755	264	218	1	0	0	9	10	10	1	2	65	78
Louisiana	41	26	1	14	228,929	304	211	0	1	0	5	6	2	1	0	24	27
Northern	20	15	0	5	59,937	165	126	0	0	0	3	3	0	0	0	13	13
Southern	21	11	1	9	168,992	139	85	0	1	0	2	3	2	1	0	11	14
Arkansas	8	5	0	3	35,140	28	50	0	0	0	1	1	1	0	0	9	10
Mississippi	6	4	0	2	41,288	45	53	0	0	0	1	1	1	0	1	10	12
Southeastern States	1	0	0	1	15,659	6	6	0	0	0	1	1	0	0	0	5	5
Montana	1	1	0	0	1,736	22	29	0	0	0	0	0	1	0	1	3	5
Wyoming	4	4	0	0	18,426	72	59	1	0	0	0	1	3	0	0	15	18
Colorado-Utah	0	0	0	0	0	21	40	0	0	0	0	0	1	0	0	5	6
New Mexico	11	8	1	2	45,330	75	78	1	0	0	1	2	2	0	0	7	9
California	47	35	1	11	170,103	362	335	0	0	1	10	11	6	0	1	62	69
Total United States	600	357	44	199	2,101,564	4,693	4,490	10	4	3	85	102	113	9	21	665	808
Total previous week	584	338	55	191	2,257,158	4,093	3,926	13	1	1	60	75	103	5	18	580	706
Total February 21, 1948	564	320	43	201	2,091,888			14	1	5	77	97	98	7	31	616	752

Service wells included: *12, †14, ‡1.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	...	....	....
19-19.9	2.19	...	...	...
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED FEBRUARY 12

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	791	2,185	293	1,394	1,460	24,990	9,132	21,134	12,026
Appalachian:									
District 1	105	307	49	119	102	2,866	401	868	463
District 2	71	225	26	60	117	1,535	127	219	232
Ind., Ill., Ky.	921	3,286	485	1,044	1,150	27,108	3,447	8,736	4,862
Okla., Kans., Mo.	432	1,735	127	629	562	12,055	761	3,425	2,423
Inland Texas	237	1,070	93	169	383	5,057	454	532	1,135
Texas Gulf Coast	1,341	4,271	758	2,181	1,588	19,200	2,976	10,371	10,462
La. Gulf Coast	427	1,314	423	671	482	6,450	1,999	3,062	3,268
N. La. and Ark.	72	202	58	69	106	2,712	399	829	233
Rocky Mountain:									
New Mexico	12	45	1	14	26	100	40	37	34
Other Rocky Mtn.	145	464	29	171	253	3,381	116	1,131	881
California	850	2,650	143	1,096	2,332	14,226	672	11,173	46,322
Feb. 12, 1949	5,404	17,754	2,485	7,617	8,561	119,780	20,524	61,517	82,340
Feb. 5, 1949	5,389	16,464	2,274	7,003	8,221	117,169	21,239	64,175	82,383
Feb. 14, 1948	5,378	15,429	2,508	7,694	8,742	107,763	10,408	36,195	50,038

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 256,899,000 bbl. as of February 12—up 2,427,000 bbl. One year ago 224,977,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas†	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.36
Bradford, Pennsylvania	4.06
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

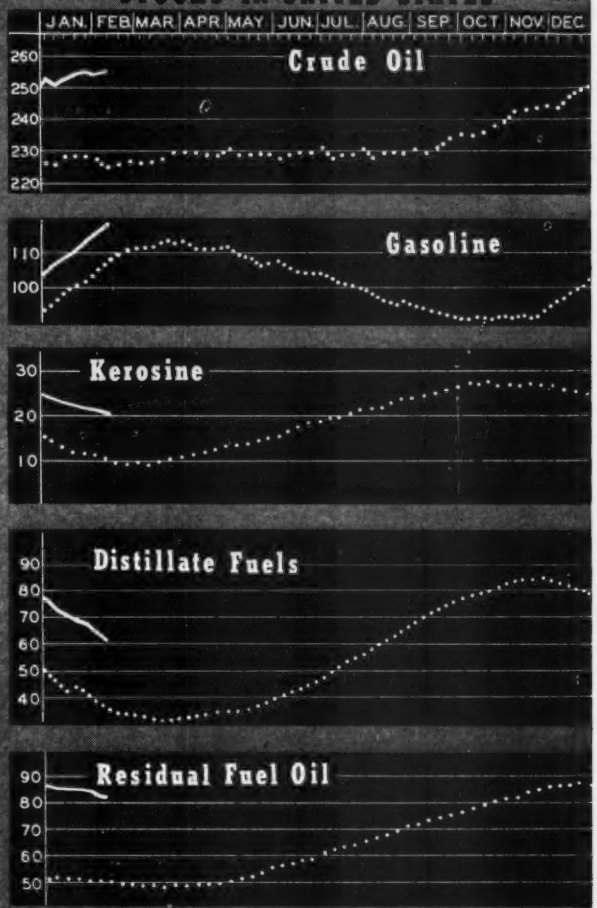
TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

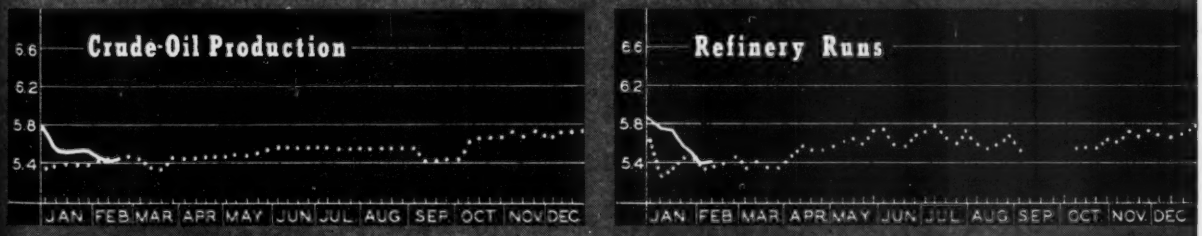
	Feb. 19 crude oil	B. of M. Feb. demand	Feb. 12 crude oil
Alabama	1,250	1,700	1,300
Arkansas	83,050	84,000	82,900
California	945,800	950,000	944,600
Colorado	*60,050	52,000	62,150
Eastern	61,500	62,300	60,000
Florida	1,200	1,300	1,200
Illinois	179,100	167,000	172,800
Indiana	24,300	21,000	20,800
Kansas	284,350	296,000	275,350
Kentucky	22,500	22,000	25,100
Louisiana	504,950	480,000	505,850
North Louisiana	118,650	.....	119,550
South Louisiana	386,300	.....	386,300
Michigan	48,650	45,000	47,900
Mississippi	105,600	126,000	109,305
Montana	23,500	24,000	23,500
Nebraska	300	700	300
New Mexico	135,000	127,000	134,850
Oklahoma	414,950	420,000	412,750
Texas	2,320,950	2,420,000	2,320,950
Dist. 1 (Southwest)	27,990	.....	27,990
Dist. 2 (Southwest)	155,900	.....	155,900
Dist. 4 (Southwest)	220,025	.....	220,025
Dist. 3 (Gulf Coast)	442,360	.....	442,360
Dist. 5 (Eastern)	44,700	.....	44,700
Dist. 6 (Eastern)	107,425	.....	107,425
East Texas Field	317,200	.....	317,200
Dist. 7-C (West)	49,950	.....	49,950
Dist. 8 (West)	660,150	.....	660,150
Dist. 7-B (W. Central)	65,925	.....	65,925
Dist. 9 (N. Central)	139,425	.....	139,425
Dist. 10 (Panhandle)	89,900	.....	89,900
Wyoming	132,100	140,000	135,000
Total United States	†5,349,100	5,440,000	5,336,650
Change from prev. wk., up	12,450		
Total production January 1-February 19			‡274,369,925 bbl.
Same period last year (crude plus cond.)			269,989,170 bbl.

*Inc. 150 bbl. Utah production. †Not incl. 85,125 bbl. condensate. ‡Incl. 4,151,920 bbl. condensate.

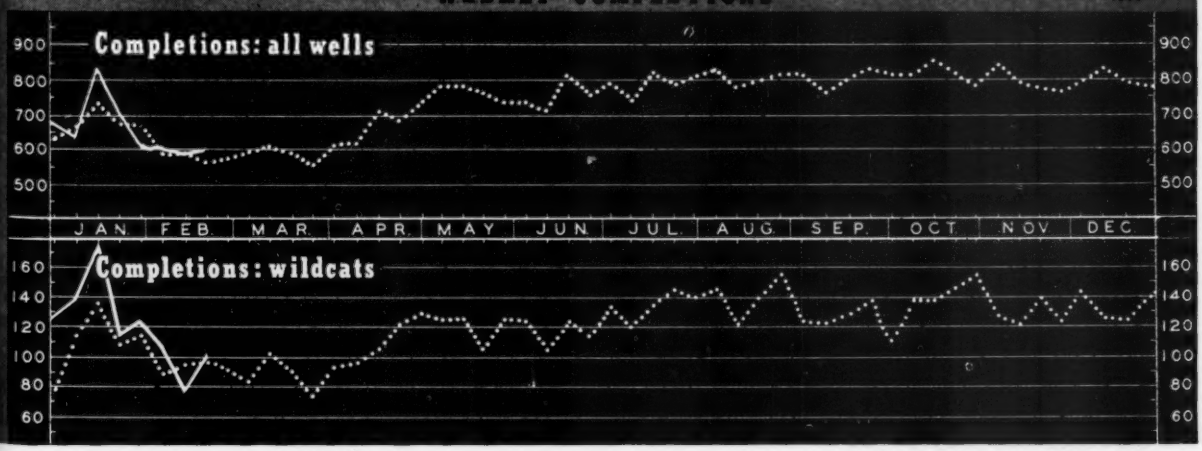
STOCKS IN UNITED STATES



DAILY OPERATIONS



WEEKLY COMPLETIONS



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8509 HIGUERA STREET, CULVER CITY, CALIF.

MARKETS

PRODUCT supplies were "ample" in all areas, almost without exception, during the past week. The overall trend downward continued but at a much slower pace as most products remained relatively unchanged.

Some observers' ventured the prediction the bottom has been reached for the present, except possibly for No. 6 fuel oil and products principally affected by seasonal changes.

In the Mid-Continent gasoline remained firm at 9 cents and slightly higher. Sales at 8½ cents had been reported in previous weeks. Burning oils were unchanged. Heavy fuel oil again showed a slight decline and was moving in quantity at $1.15 a barrel. Natural gasoline remained unchanged, but one North Texas operator was reported to have moved some stocks at 5 cents.

New York Prices Drop

On the East Coast another cut in the price of No. 6 fuel oil, amounting to 10 cents and confined to metropolitan New York-New Jersey area because of local competitive conditions, was announced February 17 by Esso Standard Oil Co.

Esso Standard at the same time reduced the price of home heating oil by ½ cent a gallon. This action indicated a further extension to light distillates o fthe prolonged weakness in the heavy-fuel-oil market.

The reductions were at all levels of wholesale delivery. The 10-cent cut in No. 6, the fifth since last November, reduced this price to an even $2 a barrel, barge, and $2.05 tank car. The new No. 2 price, barge distribution, is 8½ cents a barrel, down 0.8 cent from last November considering an earlier reduction of 0.3 cent.

Esso Standard also cut "hot" No. 5 by 10 cents to $2.42, barge, and one type No. 4 the same amount to $2.78, barge. The company's low-sulfur No. 4 was not affected.

Esso Standard's cut followed a 0.2-cent barge-level cut in No. 2 the week earlier by Socony-Vacuum Oil Co., Inc. This brought Socony's No. 2 price to 8.8 cents.

At retail, in metropolitan New York, Sylvester Oil Co., Esso's marketing affiliate, reduced No. 6 at the consumer level by 0.24 cent and No. 2 by 0.2 cent. The retail No. 2 price of Sylvester was 11.8 cents as against 12 cents last November.

Esso Standard last week raised the cargo price of 70-72-octane leaded motor fuel from 9 to 9¼ cents. This relatively low-quality gasoline is sold principally in the export trade.

Gulf Market Slow

On the Gulf Coast market conditions last week were described by one observer as "bad." Regular-grade gasoline was being sought for 9.75 cents and kerosine for 9 cents.

Action of the Texas Railroad Commission in cutting the state's March crude allowable by 200,000 bbl. was noted with interest. A pipe-line-company representative remarked that there is not now any market for heavy, residual crudes, commenting that his company had contacted with every likely purchaser in the United States.

Market observers anticipated little change for the better in the burning-oils market, pointing out that even a new and extensive cold wave in the East would be too late to affect the market in the Gulf area. Fuel oil now being bought is being obtained for consumption some months hence, he said.

Representative Quotations

Representative spot-market quotations of leading suppliers as of February 21, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	9-9½	11½-12* 10½-11½†	9¾-11¼
Premium gasoline, 78-80 octane	10-10¼	11½-12⅛	10½-12
42-44 w.w. kerosine	9-9⅛	9.8	9-9½
No. 2 straw fuel oil	8¼-8½	8¾-9	8¾-9¼
No. 6 residual	$1.15-1.35	$2.05-2.25	$1.90-2.00

*Branded (74-76 octane);† Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	7	6½	6¾
Grade 18-55	8.4	7.8	8.0

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	34
200 vis., No. 3 neutral, 0-10 pp.	15

Western Pennsylvania

144-155 vis. 10 p.t. bright stock	24.5-37.5
180 vis. p.t. neutral	25.5-38.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	5

EQUIPMENT MEN ... in the News

Dershimer is Macwhyte Factory Representative

H. S. "Dersh" Dershimer has joined Macwhyte Co., manufacturers of wire rope. As direct factory representative for Macwhyte Co., he will headquarter in Tulsa and will travel in Oklahoma and parts of Arkansas, Kansas, and Wyoming. Dershimer is well known, having traveled this territory for the past 12 years.

Ben F. Kelley Announces Firm's Incorporation

Ben F. Kelley Co., manufacturer of "Kelco" products, announces, the recent incorporation of the firm. Officers of the company are: B. F. Kelley, president and chairman of the board; William L. Kelley, vice president in charge of production and treasurer; Mrs. B. F. Kelley, secretary.

The original company was organized in 1942 as a father-and-son partnership, for the manufacture of spinning-line catheads, breakout catheads, polished-rod clamps, and air-operated power slips. Ben F. Kelley started in the oil business as a pumper in Hartford City, Ind., in 1901, and served with Gypsy Oil Co., Continental Supply Co., Titusville Iron Works, and Shaffer Specialty Co.

William L. Kelley attended University of Tulsa and Oklahoma A. & M. where he studied mechanical engineering. After leaving school, he worked for several drilling and production companies in Oklahoma, Kansas, and Texas.

Grove Announces Changes At Houston Factory Branch

E. H. McMENEMY

H. A. BROWN

J. D. HICKS

R. W. WITT

Grove Regulator Co. has announced four personnel changes in its Houston office and factory branch. E. H. McMenemy has been named district manager, R. W. "Dick" Witt has been appointed to the technical-sales staff, J. D. "Joe" Hicks has been made head of distributor sales, and H. A. Brown has joined the sales staff of the Houston branch office. Although Brown will work under the supervision of Grove's Houston office he will have his headquarters in Tulsa, serving the Oklahoma and West Texas territories.

Enlarged Kelly offices at Tulsa, showing Mrs. Ben Kelly, Ben Kelly, and William Kelly with other personnel

Hall, Pennington, Smith Promoted by James Bute

Promotion of Russell Hall, Hugh Pennington, and Rex Smith to higher positions in the paint-manufacturing division of James Bute Co., Houston, has been announced.

Hall, who has been with Bute for 2 years, heads the industrial development and technical services department. He will supervise the development and formulation of new industrial products, and maintain liaison with customers who have technical paint problems.

Pennington moves up to the position of executive assistant to the general manager. He will supervise office activities and purchasing for Bute's paint factory at Houston. Smith, as head of trade sales product development and manufacturing control, has been with Bute for 3 years.

A. S. Rubin, Jr., Made Marlow Sales Manager

Andre S. Rubin, Jr., has been appointed sales manager of Marlow Pumps. In this capacity Rubin will actively direct sales and sales promotion for the line of petroleum - production and pipe-line pumps manufactured by this company.

Rubin first became affiliated with Marlow Pumps in 1942. He has been active since that time in the development of its centrifugal pumps for oil-country use. After graduation in 1934 from Rensselaer Polytechnic Institute, Rubin became associated with Continental Oil Co.

Meyers Heads Republic Flow Meter Branch

Republic Flow Meters Co., announces the opening of its new branch office in San Francisco. Frederick H. Meyers has been appointed district manager and will handle Republic's business in that district.

Before Meyers joined Republic 12 years ago he graduated from an eastern engineering college and has been an engineer at a large eastern public-utility station for 17 years. He engineered many large control installations during the 9 years in Republic's engineering department in

Chicago and he just completed 3 years as district manager for Republic at Cincinnati.

Olson Appointed Howard Supply Export Manager

F. J. "Ole" Olson has been appointed general manager of the newly formed export division of Howard Supply Co. Olson was formerly vice president of Cardwell Manufacturing Co., in charge of California sales and later in charge of export sales in New York.

He was in charge of the export sales for International Derrick & Equipment Co. at New York until recently when he tendered his resignation with that company. Export offices are being set up in Los Angeles and Oakland, Calif., and in New York.

Baines and Harley Join Alloy Steel Products

Alloy Steel Products Co., Linden, N. J., announces that Elliot A. Baines and Henry G. Harley have joined its sales force as sales representatives and are both assigned to the New York area.

Baines is a graduate of Middlebury College and has a substantial background of metallurgical experience in stainless steel. He was formerly with American Brakeshoe Co.

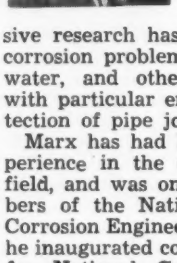
Harley previously had refinery operating experience at Aruba, N.W.I., and has also had engineering experience in the valve industry.

Nooter Boiler Names Ryan Executive Vice President

John Nooter Boiler Works Co., St. Louis, fabricators of industrial tanks and vessels, has announced that R. J. Ryan, vice president and general manager, has taken the new title of executive vice president. S. C. Tracy, former secretary-treasurer, has been elected vice president and treasurer.

H. A. Firth, another newly elected vice president, will continue also as plant superintendent. Herbert H. Koch, former assistant to the secretary and treasurer, has been elected secretary.

Dresser Appoints Marx As Corrosion Engineer



Dresser Manufacturing division, Dresser Industries, Inc., Bradford, Pa., announces the appointment of Paul F. Marx as corrosion engineer. Marx has joined Dresser in Bradford where intensive research has been instituted on corrosion problems affecting gas, oil, water, and other types of piping, with particular emphasis on the protection of pipe joints.

Marx has had long and varied experience in the corrosion-enginering field, and was one of the first members of the National Association of Corrosion Engineers. Since 1930, when he inaugurated corrosion development for National Gas Pipeline Co. of America, he has been continuously concerned with corrosion problems.

He has served as chief corrosion engineer for Northern Natural Gas Co. at Omaha, and during the war years was technical engineer with the U. S. Maritime Commission at Washington. Before joining Dresser in 1948, Marx served as chief corrosion engineer for Williams Brothers Corp., maintainers of the Big Inch pipe line.

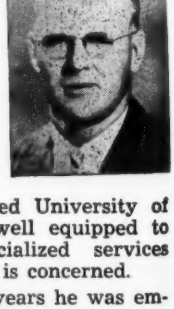
Sayers and Thompson Made Smith Division Managers

P. THOMPSON

J. SAYERS

H. C. Smith Oil Tool Co. has appointed Jim Sayers to be division manager of northern Oklahoma and Paul Thompson to be division manager of southern Oklahoma. Smith will make his headquarters in Oklahoma City, and Thompson, who was formerly northern Oklahoma division manager, will make his headquarters in Duncan, Okla.

Leo Bell to Represent Dia-Log in West Texas



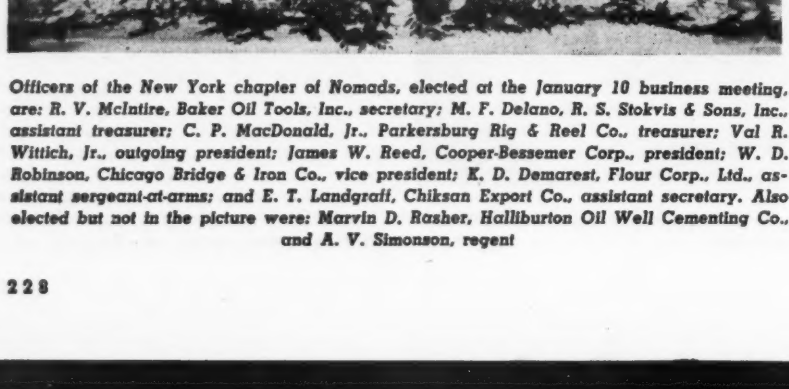
Just announced by Dia-Log Co. is the appointment of Leo Bell as West Texas division manager, with headquarters at Odessa. Bell has had extensive experience in the drilling end of the petroleum industry since he attended University of Oklahoma, and is well equipped to supervise the specialized services with which Dia-Log is concerned.

For a number of years he was employed in field work, specifically in the drilling departments of various operating companies. Later he was associated with Permian Mud Service for 3 years as mud engineer, and then became instructor in the Kilgore Junior College training program on oilfield practices. He resigned that post to accept a Dia-Log assignment in June 1948.

Lundgren Joins Kuljian

Kuljian Corp., engineers and constructors, Philadeplhia, has announced the appointment of Edwin Lundgren as its Washington, D. C., representative. Offices are located at 1415 K Street, N. W.

1949 Officers of New York Chapter of Nomads



Officers of the New York chapter of Nomads, elected at the January 10 business meeting, are: R. V. McIntire, Baker Oil Tools, Inc., secretary; M. F. Delano, R. S. Stokvis & Sons, Inc., assistant treasurer; C. P. MacDonald, Jr., Parkersburg Rig & Reel Co., treasurer; Val R. Wittich, Jr., outgoing president; James W. Reed, Cooper-Bessemer Corp., president; W. D. Robinson, Chicago Bridge & Iron Co., vice president; K. D. Demarest, Flour Corp., Ltd., assistant sergeant-at-arms; and E. T. Landgraff, Chiksan Export Co., assistant secretary. Also elected but not in the picture were: Marvin D. Rasher, Halliburton Oil Well Cementing Co., and A. V. Simonson, regent

Carter Names Dougherty Oil Industry Representative

Ralph B. Carter Co., Hackensack, N. J., has announced the appointment of Charles F. Dougherty, Tulsa, as special sales representative for the oil industry. Carter, one of the oldest manufacturers in the pump field, produces the Humdinger line.

Dougherty has had more than 30 years experience in the oil industry, from drilling to selling all types of equipment. He is operating throughout the entire midwest territory from his headquarters in Tulsa.

Hauseman Named to Girard Trust Board of Managers

Girard Trust Co. of Philadelphia has announced the election of David N. Hauseman, president of Houdry Process Corp., to its board of managers.

Hauseman has been president of Houdry since early 1948, and at that time was elected chairman of the board of directors of Catalytic Construction Co., a Houdry subsidiary. He is also a trustee of Temple University and a director of the research institute of that university.

Bayes Heads Kellogg Plant Construction in Europe

George F. Bayes, director of construction and member of the board of M. W. Kellogg Co. has gone to England to head the European division of the company. At present the company is engaged in constructing or reconstruction of nine major plants in England, France and Belgium.

In addition to the European program, Kellogg is also building major plants in Argentina, Brazil, Canada, Chile, Colombia, Iran, and Venezuela.

Baker Oil Tools Promotes Fobes and Thorne

F. S. FOBES

F. A. THORNE

Baker Oil Tools, Inc., announces the appointment of F. S. "Bud" Fobes as assistant sales manager, western division. Fobes has been associated with Baker since 1940, with time out for 4 years with the U. S. Navy.

Succeeding Fobes as director of advertising and publicity is Frank A. Thorne, who has been connected with Baker since November 1947. Thorne is well qualified to tell the "Baker Story" by experience of 2 years with Webster Training Service as a staff writer, and 10 years as director of public relations and employe relations for U. S. Engineers Department at various California locations.

Sheasby to Manage Sales Of U. S. Steel Supply

Eugene G. Sheasby has been appointed general staff manager, general sales division, of United States Steel Supply Co., warehousing subsidiary of United States Steel Corp.

Associated with the company since December 1946, Sheasby has been manager of the market development division for the past year. He was graduated from Northwestern University in 1939 with a degree in business administration.

Andrew Made Assistant To Johnston President

N. ANDREW

W. F. Bettis, manager of M. O. Johnston Oil Field Service Co., announces the appointment of Norman K. Andrew as his assistant. Andrew has had 15 years' experience with various types of service tools in California, Texas, Louisiana, Arkansas, and Kentucky, and was formerly an instructor in the college of engineering at University of Southern California.

He has been with the Johnston organization for the past 10 years, except for the time he spent with the Air Force during the war. He is an active member of the Tuesday export luncheon group of the Los Angeles Chapter of Nomads, an associate member of the Nomads, and devotes a great deal of his time to foreign oil men.

Baird Is Vice President of Standard Pipeprotection

Hugh W. Baird has been appointed vice president of Standard Pipeprotection, Inc., St. Louis. Baird is widely known in the pipe-line industry, having first-hand experience in the production, sales, protection, and installation of pipe.

Standard Pipeprotection was recently organized to coat and wrap pipe up to 12½-in. diameter, using new application techniques.

Crane's New Houston Office and Warehouse

Crane Packing Co. has recently moved into its new Houston office and warehouse located at 6626 Supply Row, Houston. The building is completely modern and air conditioned throughout.

The Southwest division of Crane Co. is under the supervision of Roy Blackbird, vice president of the company, and handles all sales and service for the territory from Kansas City to the Rio Grande. Crane manufactures a complete line of packing, mechanical seals, and closures.

Nichols Goes to Monsanto As Engineering Director

William T. Nichols, Westvaco Chemical Co., New York, will become director of the general engineering department of Monsanto Chemical Co., in St. Louis. Nichols, who is technical assistant to the executive vice president of Westvaco, will join Monsanto about March 1. After his graduation in 1922 he joined the research staff of Mellon Institute, and remained there until 1926 when he became research engineer for Columbian Rope Co., in Auburn, N. Y. In 1930 he joined Westvaco at the Cartaret, N. J., plant as a research engineer, and in 1935 was made director of research and development of the company. In 1943 he moved to New York as technical assistant to the executive vice president.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Used Bethlehem S-40 Unit complete, powered with 145-GKU Waukesha Engine. Actually used 314 hours. C. L. McMahon, Inc., Tulsa, Oklahoma.

1—SUPERIOR — Type FB — 6 x 7 Vertical Gas Engine Complete with Standard Equipment. Located in Houston. Will guarantee as good as new. Box C-783, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

2500 FT. Sparta Spudder, tools from 12½ to 5¼ cordage; Rig in A-1 condition, International motor. Now in use in Neosho County, Kansas. Available two weeks. Box 312, Cherryvale, Kansas.

FOR SALE: Mayhew 2000 Drill mounted on 1948, 2 Ton Chevrolet with Thornton Tandem. Split shaft power take off. Auxiliary Chevrolet Motor. 36 foot mast. 24 foot kelly. Uses 20′ drill pipe. 4½ by 6″ Gardner-Denver Pump. This rig new in April, 1948, is complete in all details. In perfect condition, ready to work. Price $19,000.00. Ben-Franklin Exploration, Inc., 303 Orpheum Building, Wichita 2, Kansas.

FOR SALE: Butane storage vessels. Two 34′2″ length x 10′ diameter x 1-5/32″ heads x 1⅛″ shell, code welded. $3,300.00 each. Box 610, Mt. Pleasant, Texas.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo. Colo

FOR SALE

12—230 H.P. Type 10 Bessemer New 17″ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

FOR SALE

COMPLETE GAS GENERATING PLANTS

Formerly Owned By

SO. CALIF. GAS CO.

AVAILABLE IMMEDIATELY—ENTIRE UNITS OR PARTS

- PUMPS
- BLOWERS
- COMPRESSORS
- OIL STORAGE TANKS
- GENERATORS
- EXHAUSTERS
- BOILERS
- GAS HOLDERS

NATIONAL METAL & STEEL CORP.

Dept. 25, Terminal Island, Calif. Ph.: Los Angeles—NEvada 6-2517

COMPLETE 5000-7000′ CAPACITY ROTARY RIG

$45,000.00

EMSCO Draw works; two 12-cylinder Le Roi Engines, one *new*, one *factory overhauled;* new V-Belt Compound; 7¾″ x 18″ Pump; 300-ton B-J Hook; 26″ Gumbo Buster Rotary; Regan Crown Block; Emsco Swivel; Baash-Ross Traveling Block and Blowout Preventer; Butane Tank; Tool House and Tool Box; Vibrating Shale Shaker; 5 Kw. Kohler Light Plant; 6,200′ excellent 4½″ Drill Pipe with two Drill Collars. This rig is in splendid condition, and is *complete* and ready to drill. Located at Eunice, New Mexico.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

BOILERS For Sale: One 90 H.P., 125# W.P. Broderick—$750.00; one 100 H.P., 200# W.P. Lucey—$1,250.00. Both locomotive type oil field boilers. State certificates furnished. Recently overhauled. In good running shape. Worth the money. The Clay Brothers Drilling Company, Inc., 1804 Fair Building, Fort Worth, Texas.

2—M.C. 350 Bethlehem rotary drilling rigs complete with 127′ Lee C. Moore Cantilever (Jack-knife) derricks, less drill pipe and drill collars. For further information write Sharp Drilling Company, P.O. Box 1271 Midland, Texas.

FOR SALE—CABLE TOOLS

Cable tools from 4″ to 15″, all small connections, valves of all kinds, blowout preventers, drilling gates. One all steel drilling machine or cleaning out machine with Waukesha WAK motor, OCS clutch and 60′ A Mast. Approximately 80 Tons of cable tools.
McComas Oilfield Supply, 606 S. Main, Phone 302, Box 173, Blackwell, Okla.

HOT OIL PUMPING UNITS

Two Cooper-Bessemer gas engine driven hot oil pumping units, complete. One 612 GPM, 550 p.s.i.g. pressure differential pump with 400 HP engine. One 324 GPM, 800 p.s.i.g. pressure differential with 240 HP engine. In excellent condition. Would consider selling either GNG-8 or ENG-8 engine separately. Inquire
E. B. McCormick, Chief Engineer

COSDEN PETROLEUM CORPORATION
Box 1311 Big Spring, Texas

SEAMLESS CASING

Just Pulled—Like New

Approx. 3,780 ft. 8⅝″ OD, 36.7-lb., with 10½″ collars ..... **$3.50 ft.**

Approx. 1,400 ft. 10¾″ OD, 45.7-lb., with 12″ collars ..... **$5.00 ft.**

Located western Kansas

BROWN-STRAUSS CORP.
Kansas City 10, Missouri
P.O. Box 78 L.D. 169

USED STEEL PIPE AND TUBING

100,000 ft. of 1½″ O.D., 8 gauge
75,000 ft. of 2″ O.D., 10 gauge to 11 gauge
100,000 ft. of 2¼″ O.D., 10 to 11 gauge
50,000 ft. of 3¼″ O.D., 9 gauge
40,000 ft. of 4″ O.D., 10 to 11 gauge
50,000 ft. of 5½″ O.D., 8 gauge

All the above is seamless, plain end, hydrostatically tested for 850 lbs. pressure.

16,000 ft. of 3″ standard line pipe, 8 thread
25,000 ft. of 6″ I.D. welded steel pipe, approx. ⅛″ wall, plain end
6,000 ft. of 7″ O.D. lapweld casing, 8 thread, 20 lbs.
3,400 ft. of 14″ O.D. Naylor spiral welded steel pipe, 14 gauge, 40′ lengths, grooved for Victaulic couplings

Reasonable prices. Immediate shipment

Also, bolted, welded and riveted steel tanks for storage and pressure.

600 tons of steel plates from ¼″ to ⅞″ coming from grain tanks, like new, free of holes.

Please send for our late lists.

A. GREENSPON PIPE CO., INC.
3615 Olive Street St. Louis (8), Mo.
Phones Nos. Franklin 0064 and 1606

EQUIPMENT FOR SALE

FOR SALE: One 8 HP Pattin Bros. gear power. Will pump eight shallow wells. Used little over year. May be seen at Charles Melton Lease; Chatham, Ohio. Baldwin Drilling Co., Berea, Ohio.

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000'—Respooled for Your Inspection — Cable Tools For Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: 1—Model QSVSI Cardwell Allsteel Single Drum Oil Well Servicing Skid Type Winch, Serial No. QS-119, powered by Ford V-8 Engine Serial No. BB18-4103910 located at Duncan, Oklahoma. Price $900. Cities Service Oil Co., Patridge, Bartlesville, Okla.

EQUIPMENT FOR SALE

CABLE TOOLS DRILLING RIG COMPLETE
66 WICHITA SPUDDER, 200 HP LeROI
Phone 423-J, Artesia, New Mexico, Box 125

APPROXIMATELY 43,000' New 2⅜" OD, Range 1, 4.7# Upset Tubing. Ft. Worth, Texas, ready for shipment. Subject to prior sale. Midwestern Constructors, Phone 3-4113, Tulsa, Oklahoma.

FOR SALE: Wilson Giant draw works, powered by 2—J.L.-1335 Buda engines and Wilson chain compound. Like new condition, with bargain price. Terms. Melton Supply Co., Seminole, Okla.

FOR SALE: 2—12" x 30" Connersville Vertical Type Blowers, 1400 CFM, 1# WP, 275 RPM, requiring 8.6 HP. Cities Service Oil Co., Patridge, Bartlesville, Okla.

EQUIPMENT FOR SALE

FOR SALE: J-55—5½"—17# Casing, drive pipe from mill, 10,000 ton contract; end-users only. Box C-791, The Oil and Gas Journal, Tulsa, Okla.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W Sternberg, 8250 Wier Drive, Houston, Texas Phone Preston 7043.

FOR SALE

We specialize in spot shipments of oil well casing. Listed below are a few of our current offerings:

NEW SEAMLESS OIL WELL CASING

	Price per ft.	F.O.B.
50,000' J-55 5½" OD 15½# 8 Rd Thr, Long Coup., Range 2	$2.40	Dallas Area
20,000' J-55 5½" OD 17# 8 Rd Thr, Long Coup., Range 2	2.50	Dallas or Okla. City Area
9,000' J-55 7" OD 20# 8 Rd Thr, Long Coup., Range 2	2.75	Dallas Area
20,000' J-55 7" OD 23# 8 Rd Thr, Long Coup., Range 2	3.00	Dallas Area
3,000' J-55 & H-40 8⅝" OD 24# 8 RT Long Coup., Rng. 1&2	3.00	Pitts. Area
3,000' J-55 & H-40 10¾" OD 32¾" 8 RT Long Coup., Rng. 1&2	4.50	Pitts. Area
3,000' J-55 10¾" OD 40½# 8 RT Long Coup., Range 1 & 2	5.50	Dallas Area

NEW TUBING

70,000' J-55 2⅜" OD Ext. Upset Tubing, 8 RT, Range 2	.85	Dallas or Okla. City Area
13,000' J-55 2⅞" OD Ext. Upset Tubing, 8 RT, Range 2	1.00	Los Angeles Area

ABOVE OFFERED SUBJECT TO PRIOR SALE

USED MATERIAL OFFERED WITH CERTIFICATE OF INSPECTION

20,000' Grade D & C 7" OD 24# 10 Thr. Long Coup., Range 2	2.50	Bradford, Pa., & Dallas Area

LINE PIPE

40,000' 4" OD Line 7.6# PE, Range 3	.75	St. Louis Area
9,000' 10" OD 32¾#, Range 1	3.30	Charleston Area
4,400' 8" OD 28#, Range 3	2.25	Charleston Area

A. G. GHYSELS CO.
1209 No. State St., Chicago 10, Ill. Superior 7-4412

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts

OKLAHOMA MACHINE & SUPPLY CO
Ada, Oklahoma

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE

3713 feet 9⅝ O.D. 40.6# Seamless Oil Well Casing. Run in well but in excellent condition. Priced to sell.

1—125 H.P. 350# Working Pressure "Oil Well Boiler," completely reconditioned and in excellent condition. State inspected. $2250.00 our yard, Okla. City

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Okla.

Will Sacrifice!
PRESSURE VESSELS

1—9'-2⅞" x 39'-1" x 1 7/16", one 36" O.D. man way and one 16" O.D. man way.
2—4'-0" x 21'-2" x 1" with removable head bolted to shell. Can be bolted together to make one vessel approximately 37' long.
1—7'-11" x 39'-5¾" x 31/32" vessel.
1—6'-0" x 23'-10" x ½" vessel.
2—4'-9" x 6'-0" scrubbers, U-69. Code welded. 60 P.S.I. at 650° F.
1—5'-0" x 9'-9" x 9/16" scrubber.
1—3'-1" x 15'-0" x ½" scrubber with one 16" man way.

ABSORPTION TOWER

1—5'-0" x 44'-7" x ⅜" welded construction, 13 trays with man hole at each tray. Pipe coil in bottom.

TANK CAR TANKS

1—7'-3" x 29'-0" x ½", 10,000 gal.
1—6'-6" x 25'-0" x ⅜", 6,000 gal.
1—5'-8" x 20'-1" x 5/16", 4,000 gal.

Above vessels have necessary pipe connections. All offered as is, where is, subject your inspection and acceptance. Located at our plant.

WRITE, WIRE OR PHONE

BROWN-STRAUSS CORP.

LD 169, P. O. Box 78, Kansas City 10, Missouri

NEW A.P.I. STEEL BOLTED TYPE TANKS

4— 250 bbl.	4— 1,500 bbl.
4— 500 bbl.	4— 2,000 bbl.
6— 750 bbl.	1— 5,000 bbl.
4—1,000 bbl.	6—10,000 bbl.

2—500 bbl. aluminum, 8 gauge

All for immediate shipment

A. GREENSPON PIPE CO., INC.
3615 Olive Street St. Louis 8, Missouri

RECONDITIONED SEAMLESS TUBING

95,000 ft. 1½" O.D.
120,000 ft. 2" O.D.
55,000 ft. 2¼" O.D.
75,000 ft. 3¼" O.D.
80,000 ft. 4" O.D.
21,000 ft. 5½" O.D.

Single or Double Random Lengths—Plain Ends
Beveled for Welding
Approx. 10 ga. Wall

Write—Wire—Phone

SONKEN-GALAMBA CORP.
2nd and Riverview (X-422)
Kansas City 18, Kansas
THatcher 9243

EQUIPMENT FOR SALE

FOR SALE: Model "K" Cardwell, single drum draw works powered by G.A.K. Waukesha engine. Equipped with 98' "A" mast and sub skid. Priced for quick sale. Terms. Melton Supply Co., Seminole, Okla.

FOR SALE—Cardwell Draw Works, Model "L"—Air Clutches—A-1 Condition. Box 3246, Corpus Christi, Texas.

PIPE: 4000' 5½" OD, 14#, 8 rd. thrd., Range 3 seamless casing; 4000' 5½" OD, 14#, 8 rd. thrd., Range 2 seamless casing; 4750' 2" EUE, 4.7#, 8 rd. thrd., Range 2 seamless tubing; Two 210 bbl. welded tanks; One Bethlehem, 25-T B-5 pumping unit with FM ZC118. The above material purchased new less than 60 days ago and is now in same as new condition.
25,000', 2" EUE, 4.7#, 8 rd. thrd., Range 2 Seamless tubing; 5000', 5½" OD, 14#, 8 rd. thrd., Range 2 new seamless casing. All the above subject to prior sale. Geo. R. Brown, Jr., 911 Neil P. Anderson Bldg., Fort Worth, Texas. Phone 2-7088.

FOR SALE: Approx. 600' of 7" 22# used Seamless Casing, 1500' of 2½" 10thd Seamless used Tubing. Tennant Drilling Co., 210-211 Rivoli Theatre Bldg., Blackwell, Okla.

FOR SALE: 5CR6 Ideco Draw Works with 2 WAK Waukesha Motors compounded with V-Belt Compound; Model RL Cardwell Draw Works with 2 GAK Waukesha Motors; and 1—R6I Climax Motor. All in good condition. Sterling Drilling Company, Sterling, Kansas.

BUCYRUS-ERIE 24L Spudder, Trailer mounted; over 5,000 feet line; 2 strings of tools 4 inch to 10 inch; 2½ ton G.M.C. Tandem Dual Truck with detachable A-Frame and winch; 8-ft. x 10 ft. metal tool shed; Kohler Light Plant; 470 ft. new 10 inch wrought iron pipe; some used 6 and 8 inch pipe. All $10,000.00. Lealand West, The Scott County State Bank Building, Scottsburg, Indiana, Telephone 4931 or 4391.

1—7¼ x 14 OILWELL Power Pump for rotary tools steam or power. Chapman Pipe & Supply, Oklahoma City, Okla.

6" STD. LINE PIPE

50,000 ft. 6⅝" O.D., 18.97# Lapweld, 40 ft. random lengths, ends beveled for welding, used, good condition. Located near East St. Louis, Ill.

HORWITZ PIPE & STEEL CO.
Ph. 2-9128 Tulsa, Okla.

50,000' 6⅝" 18.45# T&C Line Pipe. No. 1, Used. Located: Longview, Texas.

6,800' 5½" 15.5# J-55 Seamless. New. Located: Ellinwood, Kansas.

3—55,000 bbl. and 1—80,000 bbl. all-welded steel storage, for lease or sale. Located: Danciger Refinery, Longview, Texas.

W. C. BERRY
Tulsa, Oklahoma
Box 1858 Phone: 3-6141
Dallas, Texas
1509 Mercantile Bank Bldg.
Phone: Central 2950

STEEL STORAGE TANKS

12-55,000 Bbl.
2-18,000 Bbl.
1-17,500 Bbl.
1-15,000 Bbl.
7- 5,000 Bbl.

All above tanks available for prompt delivery. Detailed specifications, locations and prices available upon request.

HORWITZ PIPE & STEEL CO.
P. O. Box 2534, Tulsa, Okla.
Phone 2-9128

EQUIPMENT FOR SALE

BULLDOZER: AC-HD7 Cable operated, angle and Bull blades. Top condition. Quick sale—$5,500.00. 19 Endicott St., Phillips, Texas; Phone 1388-W, Borger, Texas.

FOR SALE: 353 feet of 12¾", 45# Byers genuine wrought iron pipe, new, range 1, Th & C. $7.00 ft. at Omaha. Omaha Drilling Corp., 624 Service Life Bldg., Omaha 2, Nebr.

EQUIPMENT WANTED

WANTED: 3½" OD or 4½" OD used drill pipe, 3½" OD line pipe or tubing. SCHAFER PLOW, INC. Box 578, Pratt, Kansas. Atten.: J. L. Crowder.

EQUIPMENT WANTED

Am interested in purchasing good-second-hand, unit 15 rig, with either 2 or 3 motor compound. Please send description, price, and location to: Box C-732, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Portable 4500' Rotary Rig complete with drill pipe. Prefer truck mounted. Send inventory photos and complete details. Krug Drilling, Burlingame, California, 717 Linden Avenue.

WANTED: Small portable drilling rig, complete with tools. Cash or drilling deal. Elmer Gant, Greenville, Kentucky.

HELP WANTED

EXPERIENCED and rounded Land Man for large company, preferably with Texas experience. Age limit 45 years. Inquiries will be treated confidentially. Box C-801, The Oil and Gas Journal, Tulsa, Oklahoma.

LARGE oil company has opening for man experienced in sales, marketing, transportation, etc., of liquefied petroleum gas, principal objective selling. Engineering training desirable not required. State age, experience and qualifications. Box C-800, The Oil and Gas Journal, Tulsa, Oklahoma.

GRAVITY PARTY CHIEFS: We have several attractive openings in domestic work for experienced and well qualified Party Chiefs. Best opportunities in the industry. Box C-804, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED by aggressive independent operator: Young Geologist with well experience in North Central Texas. Salary open. Box C-796, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED
CHIEF CHEMIST FOR CONTROL LABORATORY

TYPE PLANT: Absorption plants with reformer unit producing conventional petroleum products.
QUALIFICATIONS: Position requires person with knowledge of usual control analyses, knock engine operation, water treatment, pod analysis, and general work associated with gasoline plant operation.
LOCATION: Southeast Texas, Gulf Coast area.
HOUSING: Available in immediate area.
SALARY: In line with responsibilities.

Box C-775, The Oil and Gas Journal, Tulsa, Oklahoma

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.
2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

WANTED: Supervisor for refinery pump and engine maintenance. Applicant must have engineering training and experience. Good salary with house furnished at low rent. Box C-746, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Geologist with at least six years' experience in Texas Gulf Coast Area. Box C-758, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Sales Executive: Large midwest independent has immediate opening for experienced bright stocks and neutrals sales executive. Unusual opportunity. In replying give full information stating age, education, experience, salary required. Replies will be held confidential. Box C-790, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER: Midwest independent operating four refineries producing light oils, lubes, waxes and asphalts requires engineer with a minimum of 10 years refinery process and engineering design. Should be capable of carrying projects from economic study through process calculation, equipment design, and operating technique. Future for right man excellent. Give full particulars in first letter. Replies held confidential. Box C-787, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGER
OILFIELD EQUIPMENT

Old established manufacture desires Sales Manager to direct and increase sales of Well Head and Christmas Tree products. Applicant must have had previous experience in above fields.

Box C-806

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

CORROSION ENGINEER

Graduate engineer experienced in all types of oil field corrosion to take charge of field corrosion problems and research work. Under 40 years of age.

RESERVOIR ENGINEER

Experienced reservoir engineers including specialist in secondary recovery problems on both water and gas.

WIRE LINE OPERATOR

Man experienced in wire line work to operate bottom-hole sampling truck and perform some related laboratory work. In reply state experience, education and salary expected.

CONTINENTAL OIL COMPANY
Personnel Division, Ponca City, Okla.

SITUATIONS WANTED

CHEMICAL ENGINEER: Degree, 15 years experience laboratory and pilot plant. Available immediately. Age 38. Box C-808, The Oil and Gas Journal, Tulsa, Oklahoma.

OILFIELD supply executive with wide acquaintance in the Gulf Coast area desires change. Twenty years' experience in every phase of the petroleum supply business. Would consider responsible, executive position with some good supply company or oil company, needing man with these qualifications. Can furnish best of references. Box C-807, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY CHEMIST: Experience in all phases of laboratory control and development of industrial and specialty asphalts. Reply: Box C-805, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE PETROLEUM ENGINEER, 7 years experience in drilling, completions, and production. Have some experience in geology and administrative work. Young, single, willing to work anywhere. Box C-802, The Oil and Gas Journal, Tulsa, Oklahoma.

PLANT, Instrument, or Measurement Engineer. Degree. Twelve years' experience refinery, pipeline, gas measurement, G.P.M., and Calorimeter. Age 35. Box C-809, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GEOLOGIST: Experienced in subsurface and well Geology, also some experience in petroleum engineering, desires position in Rocky Mountain area. Single, age 30, available in May 1949. Box C-781, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Mechanical Engineer, age 29, five years plant engineering and maintenance. Boiler plant experience, also pumps, compressors, and large gas engines. Seeks position in refinery or gasoline plant. Write: Box C-798, The Oil and Gas Journal, Tulsa, Oklahoma.

CAPABLE Oil Executive to manage and operate leasing, drilling, and producing oil properties. Thoroughly reliable, twenty years' experience. Available March 1, 1949. Box C-770, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent with 26 years' experience desires oil production job, domestic or foreign. References. Box C-794, The Oil and Gas Journal, Tulsa, Oklahoma.

SECRETARY with initiative and executive ability, extensive oil experience and with legal training desires permanent connection with independent oil company in Mid-Continent area. Available soon. Write Box C-780, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL COMPANY PILOT
Airline Transport Rating. Three years piloting TWA, Six years ATC Senior Pilot, world wide experience, all equipment. No accidents. Two years college, selling experience. Married, Age 36. Interview and first move my expense. Richard Belden, 11957 Riverside Drive, North Hollywood, Calif.

MAILING LISTS

OPERATING Personnel Lists of Production, Refining, Natural Gasoline, Pipelines, Drilling, Supply Stores, etc. Guaranteed. Catalogue Free. Our 29th Year. Oil Industry Mailing List Co., Box 3603, Tulsa, Okla

WAREHOUSE SPACE—FOR RENT

WAREHOUSE space in Wichita Falls, Texas. Prefer tenant handling oil field specialties. Attractive new building on main highway. Convenient to oil field supply companies. If interested communicate with Larkin Packer Company, 1502 Maury Street, Houston, Texas.

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1949 EXECUTIVES MAP OF PERMIAN BASIN

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CALENDAR

February

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

American Institute of Chemical Engineers, regional meeting, Biltmore Hotel, Los Angeles, March 6-9.

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Association of Petroleum Geologists, regional meeting; Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, Jefferson Hotel, St. Louis, Mo., March 14-17.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Illinois Oil and Gas Association, annual meeting, Hotel Emmerson, Mount Vernon, Ill., March 25.

North Texas Oil and Gas Association, annual meeting and secondary-recovery forum, Hotel Kemp, Wichita Falls, Tex., March 25-26.

Western Petroleum Refiners Association, thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting, San Francisco, March 27-April 1.

April

Texas Independent Producers and Royalty Owners Association, Houston, April 1.

American Petroleum Institute, division of refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, Cincinnati, Ohio, April 11-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

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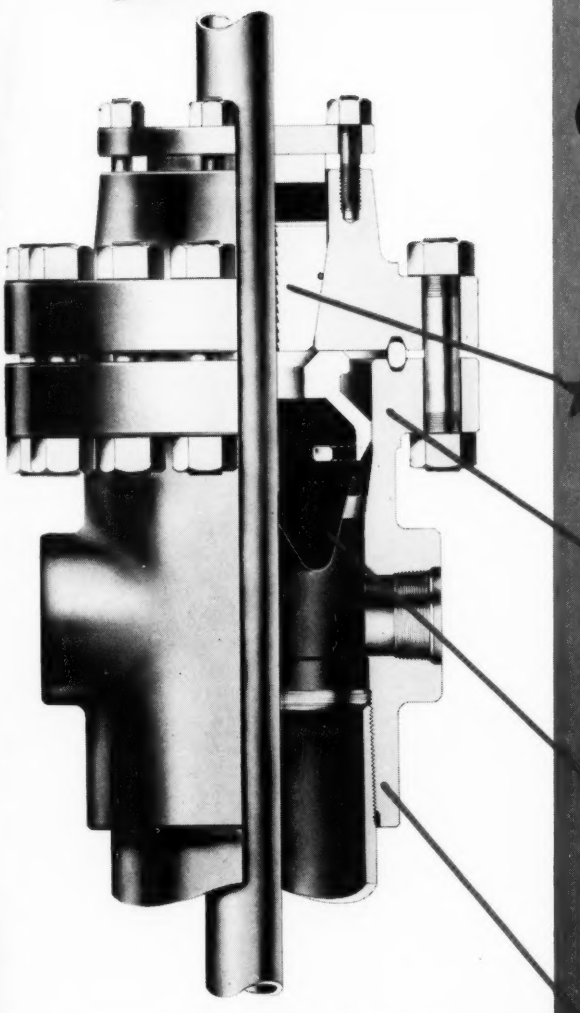

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